Plastics

DEALING WITH THE MANUFACTURE, USES AND POTENTIALITIES OF PLASTIC MATERIALS

Erinoid

Plastics Materials

EXTRUSIONS
Sections in all materials to customer's specifications
Polythene Pipes, P.V.C. Rigid Pipes, P.V.C. Hose Pipe, Acetate Tubes and Rods

P·V·C
Pressed Sheets
Calendered Sheeting

CASEIN
Sheets and Blanks
Rods and Tubes

CELLULOSE ACETATE
Moulding Powders and Sheets

POLYSTYRENE
Moulding Powders in grades for all purposes, Sheets

ERINOID LIMITED · STROUD · GLOUCESTERSHIRE

BEXOID Regd

moulding powder

for speedy mouldings—
of exceptional
strength and finish

BX PLASTICS LTD.,

Out in front

AND STAYING THERE!

U·M·P PLASTICS

The mouldings illustrated show what has been achieved by U·M·P in recent development work for the Battery Industry.

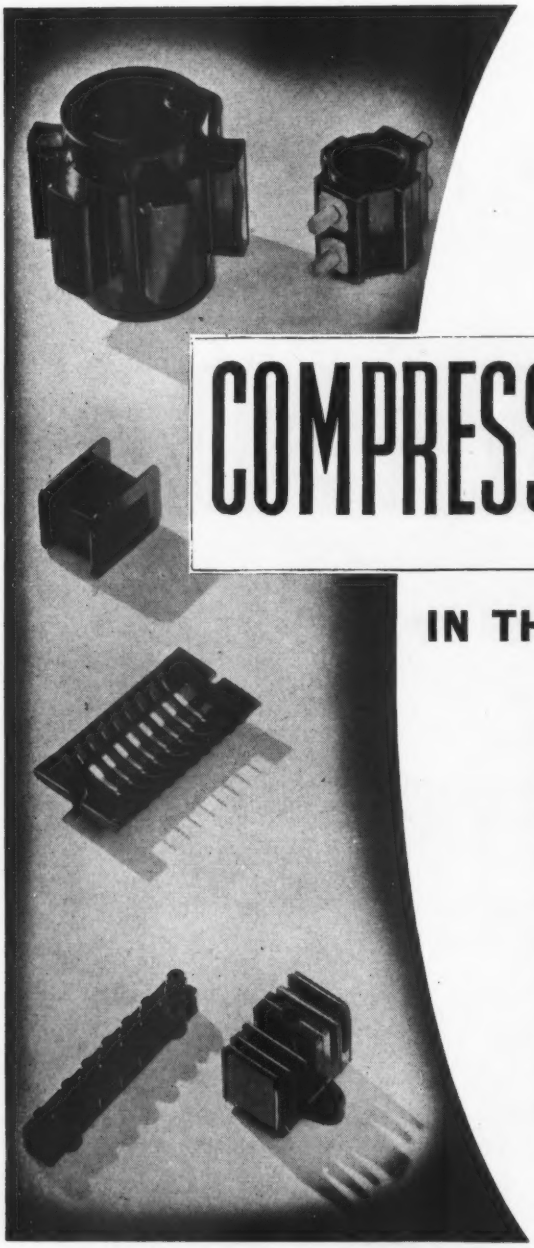
A similar service is at the disposal of EVERY Industry interested in PLASTICS.

For Glass or Asbestos Fibre Reinforced Plastics, consult our Lamforte Section.

U·M·P
For Tubes and Plastics

Why not telephone
PENDLETON 1631

UNIVERSAL METAL PRODUCTS LTD.
SALFORD 6 LANCS. *Telephone:* PENDLETON 1631-2-3
LONDON OFFICE: ARGYLE HOUSE, 29/31, EUSTON ROAD, N.W.1. TEL. TERMINUS 2073



TP DUNSTABLE

COMPRESSION and TRANSFER MOULDINGS

IN THERMO SETTING MATERIALS

Many famous firms have discovered that by approaching THERMO-PLASTICS LTD. their moulding problems are simplified. They know that complex shapes and intricate designs will be faultlessly moulded in any quantities with precision and complete fidelity to the original pattern.

You, too, can entrust your work to Thermo-Plastics Ltd. where production is planned to keep abreast of customers' requirements.

A highly qualified technical staff is at your service.

Thermo-Plastics Ltd.

Moulders and fabricators of all plastic materials, including glass and asbestos reinforced laminates, Perspex, P.V.C., Polystyrene, Cellulose Acetate, Polyethylene, Nylon, Phenol - Formaldehyde, Urea - Formaldehyde, etc.

THERMO-PLASTICS LTD. · DUNSTABLE · BEDS

Telephone: DUNSTABLE 686/7/8 and 777 *Telegrams:* THERMOPLASTICS, DUNSTABLE

YADRAN Limited

137 *Blenheim Crescent, London, W.*11 • *Telephone: Bay* 8911 • *Cables: Yadran, London*

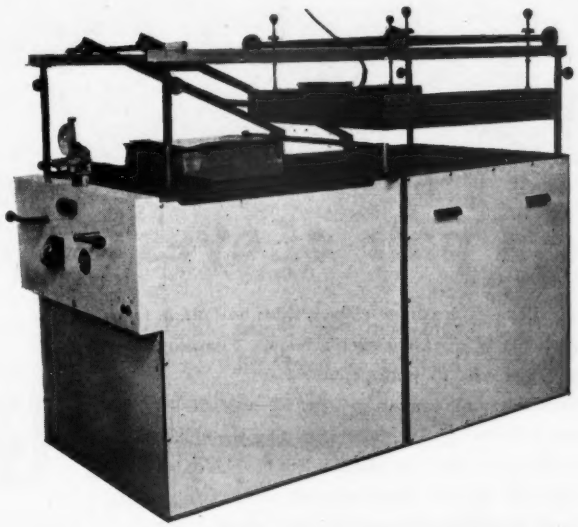
The Managing Director,
Plastics Patents.

September, 1954

Dear Sir,

We should like to introduce you to the most up-to-date development in the field of plastics:—

THE PLASTOVAC VACUUM FORMER



This machine will enable you to produce articles of varied designs without expensive moulds. For mass production on the Plastovac Vacuum Former, moulds of wood, plaster, resins, etc., can be used. The Plastovac Standard Model No. F.W.1. is fully adjustable up to 32" x 24" x 11" deep.

Please note these important points:—

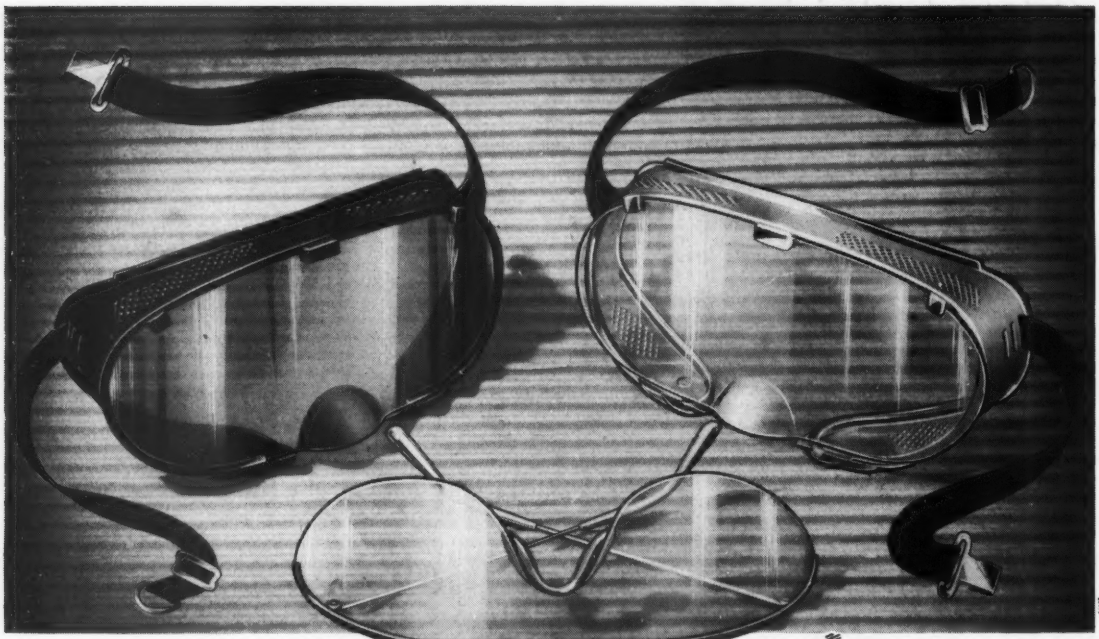
- **Small initial investment**
- **Fast cycle of operation**
- **Low running costs**
- **Adaptable to most thermo-plastic materials**
- **Simple and inexpensive moulds**
- **Use of unskilled labour**
- **Colour printing simplified**
- **Handles sheets from .005" to 3/16" thickness**

- **Price: £375 . 0 . 0**

Special sizes can be made to your requirements, and we shall be glad to supply detailed specifications and arrange a demonstration at your convenience.

Yours faithfully,

for YADRAN LIMITED.



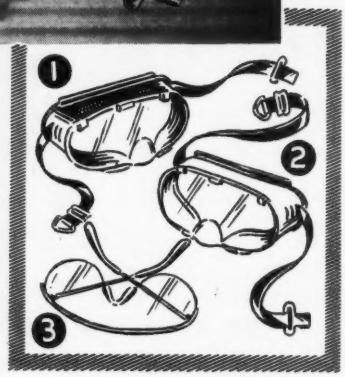
What price a pair of eyes?

There is only one answer to that question — you cannot place a value on sight in terms of cash. For this reason we were particularly interested when a famous Company asked us to design and produce Industrial Goggles for its work people.

They were so effective that soon enquiries were coming in from all over the country. Their lightweight makes them comfortable to wear, without impairing the efficiency of the worker and they have the great advantage that the windows can be replaced in a few seconds. This not only lengthens their life but also effects a considerable saving in cost.

We can supply them at 60/- per dozen — replacement windows 1/6d. each.

The spectacle type are 90/- per dozen. Ask for samples.



1. Green-tinted goggles (B.S.I. approved for gas welding without flux). Soft, pliable Polythene frame, moulded to the contours of the face for perfect comfort.

2. Similar to above, but in clear plastic. Both models have ventilation grids to prevent condensation. Replaceable windows.

3. Used when side protection is not needed. Clear or tinted window with solid moulded bridge. Metal-framed moulded plastic earpieces.

Our versatile plant enables us to produce them at a low price and still maintain a high quality. This plant backed by over 30 years' specialised experience in moulding practice is at your disposal. Send us your moulding problems.

One of the three bays in our compression moulding works at Cheapside.

Some of the machines in our injection moulding works at Summer Lane.

HEAD OFFICE and WORKS: 315 SUMMER LANE, BIRMINGHAM, 19

Telephone: ASTon Cross 1156/7/8/9

E. Elliott LIMITED

THE MOULDERS WITH THE ENGINEERING BACKGROUND

theres's a right BRP material

for every moulding job

THE Cellomold and Distrene ranges, together, meet every conceivable injection moulding need.... That is why so many injection moulders rely *entirely* on Cellomold and Distrene plastics moulding materials, made by BRP.

"CELLOMOLD"

Cellulose acetate moulding materials

Standard grades in a wide range of colours

- Durable • Tough & Strong
- Rigid or flexible as required
- Resistant to corrosion • Odourless, tasteless, non-toxic • Pleasant to the touch
- Non-inflammable

"DISTRENE"

Polystyrene moulding materials

Normal, medium impact and high impact grades

- Dimensionally stable even under extreme humidity
- High gloss surface finish • Water resistant
- Resistant to dilute acids • Strong and durable.

Ask to be put on our Mailing List (T) for regular information about BRP Moulding Materials

BRP

BRITISH RESIN PRODUCTS LIMITED

Sales and Technical Service: DEVONSHIRE HOUSE · PICCADILLY · LONDON, W.1

Telephone: Mayfair 8867

The BRP range of synthetic resins and plastics raw materials

Cellobond
Synthetic Resin Adhesives
Phenolic, Urea, Resorcinol
Polyester Resins
Core Binder Resins
Shell Moulding Resins

Cellomold
Cellulose Acetate Moulding Materials

Distrene
Polystyrene Emulsions
Polystyrene Moulding Materials

Epok
Alkyd Resins
Pure and Modified Phenolic Resins
Maleic Resins
Urea and Melamine Resins
Coumarone Indene Resins
Cashew Nut Shell Liquid Resins
Laminating and Impregnating Resins
Rubber Resins
Polyvinyl Acetate Emulsions

Rockite
Phenolic & Urea Moulding Materials
Phenolic & Urea Extrusions

Reprocessed Polystyrene and Cellulose Acetate in metallic or opaque colours

Now you can have reprocessed polystyrene and cellulose acetate in those attractive metallic colours which hitherto have been obtainable only in virgin material.

Grist reprocessed compound, although costing far less than the virgin material, is guaranteed to have good moulding properties, and is suitable for innumerable products for which the use of top-grade material would be an unnecessary and wasteful expense. Now that the limitations on colour have been removed, you will no doubt find even more uses for Grist reprocessed polystyrene and cellulose acetate.

Samples for testing available on request.

Have you tried Grist Reprocessed Polythene supplied in all shades?

Telephone: **VICtoria 1823** or write to:—

GRIST PLASTICS

LIMITED

167, VICTORIA STREET, LONDON, S.W.1

ONE OF THE **DOHM** GROUP OF COMPANIES

We welcome enquiries for reprocessing customers own material into any colour including Metallics.

IF YOU WISH TO DISPOSE OF ANY THERMOPLASTIC SCRAP WE WILL GLADLY QUOTE

It is no secret. In fact we're only too glad to talk with so many people becoming interested in the dozens and dozens of jobs that Tyglas does better. This amazing glass fabric has such unique properties that it is certainly one of the most promising of the new basic materials. It opens up all kinds of opportunities in the field of development. Already it has created a small revolution in insulation, pipe lagging and boiler jacketing. Tyglas just cannot be ignored when constructional projects are being considered.

Write for detailed information. We shall be glad to co-operate.

Tyglas

WOVEN GLASS FABRICS

Fothergill & Harvey (Sales) Limited

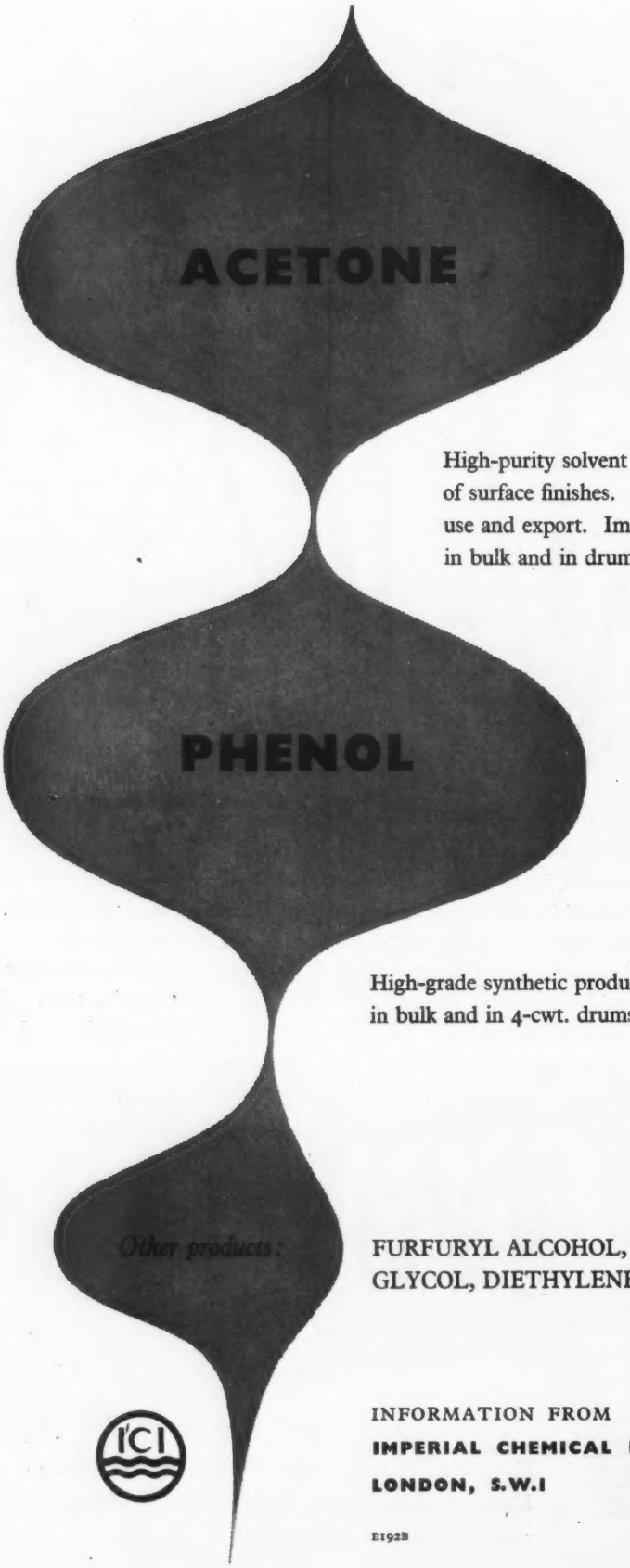
LEADING MAKERS OF WOVEN GLASS FABRICS

Harvester House, Peter Street, MANCHESTER 2

Mayfair address : 103 Mount Street, LONDON W1

and at GLASGOW and BELFAST

TSI



High-purity solvent in the formulation of surface finishes. Available for home use and export. Immediate delivery in bulk and in drums.

High-grade synthetic product, delivered in bulk and in 4-cwt. drums.

FURFURYL ALCOHOL, ETHYLENE GLYCOL, DIETHYLENE GLYCOL.

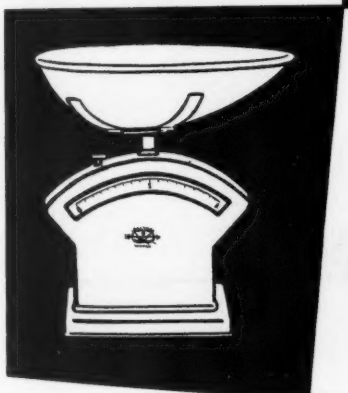
INFORMATION FROM
IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON, S.W.1

E192B

NEW WORK FOR OLD FRIENDS

A balance to our credit

It was in 1938 that Geo. Salter & Co. Ltd., of West Bromwich, first approached us with a request to mould a domestic scale. The pattern was similar to that already being made in sheet metal and comprised 4 separate mouldings. A standard thermosetting material was chosen and we continued to mould the scale in quantity for 15 years.



Then, in 1952, our customer decided to develop a new domestic scale and asked for our help to produce their design as a moulding. The new No. 59 Balance was the result of using improved techniques and materials perfected during the intervening years. The body, lens and scoop are injection moulded in Polystyrene. This is but one of the many examples of how Streetly Service has satisfied Old Friends.

MOULDED BY STREETLY

THE STREETLY MANUFACTURING CO. LTD.,

STREETLY, SUTTON COLDFIELD, NR. BIRMINGHAM.

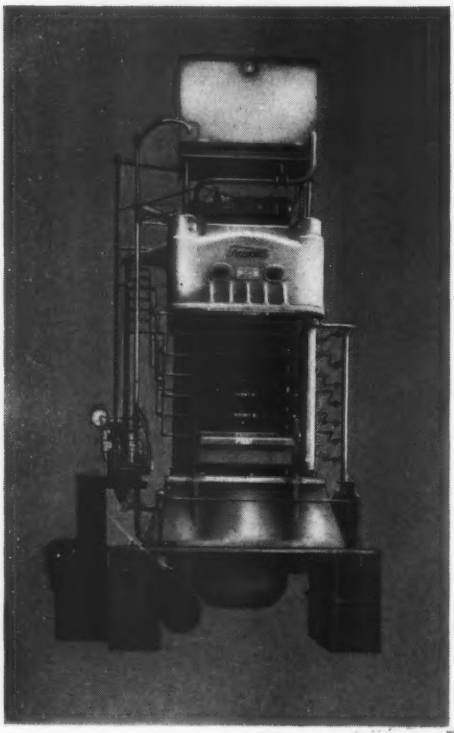
Telephone: Streetly 78411.

Telegrams: Bang Streetly.

B·I·P GROUP

hydraulic presses for the rubber and plastics industries

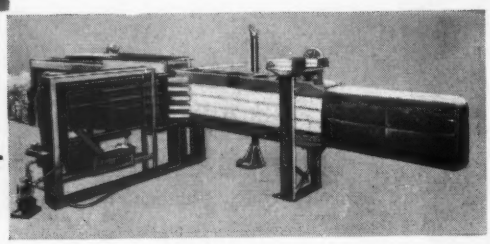
Right:—A Fawcett press for veneer and plywood. Easily adaptable for other materials. Made in various sizes as required.



The ever increasing part played by the rubber and plastics industries in modern economy has lead to a corresponding development in processing plant and technique. Leading the way are Fawcett, Preston & Co. Ltd., who with nearly two hundred years' experience, offer a range of hydraulic and baling presses unsurpassed for reliability and efficiency.

Left:—Operated by its own self-contained pump, this 2,000-ton up-stroking multi-platen press is for pressing asbestos and synthetic materials.

Below:—A specially designed horizontal machine for baling synthetic fibres. Bales are delivered ready for transportation.



Fawcett EST 1758

Special presses designed to suit individual requirements

FAWCETT, PRESTON & CO. LTD., BROMBOROUGH, CHESHIRE. *PHONE: ROCKFERRY 2201 (5 LINES)*

P4625

LIVELY LADS at Lorival would like to meet lively production engineers with a view to Injection Mouldings

LORIVAL PLASTICS

Lorival Plastics have a large range of Injection Machines and a full range of thermo-plastic materials.

UNITED EBONITE & LORIVAL LTD · LITTLE LEVER · NEAR BOLTON · LANCS

L.48c

FOR MOULDING IN THE ELECTRICAL AND ELECTRONIC FIELD

Under a licence agreement to manufacture in accordance with the

PLASKON

· Patents and Processes a range of

ALKYD MOULDING COMPOUNDS

is to be manufactured in Britain. Bulk production of

A.M.C. 440A - glass filled has now commenced

This will be followed at intervals with

ALKYD MOULDING COMPOUND	420 GRANULAR
	422 Granular - self extinguishing
	411 PUTTY
	417 Putty - self extinguishing

FOR SAMPLES, LITERATURE AND FULL DETAILS PLEASE CONTACT

RCL

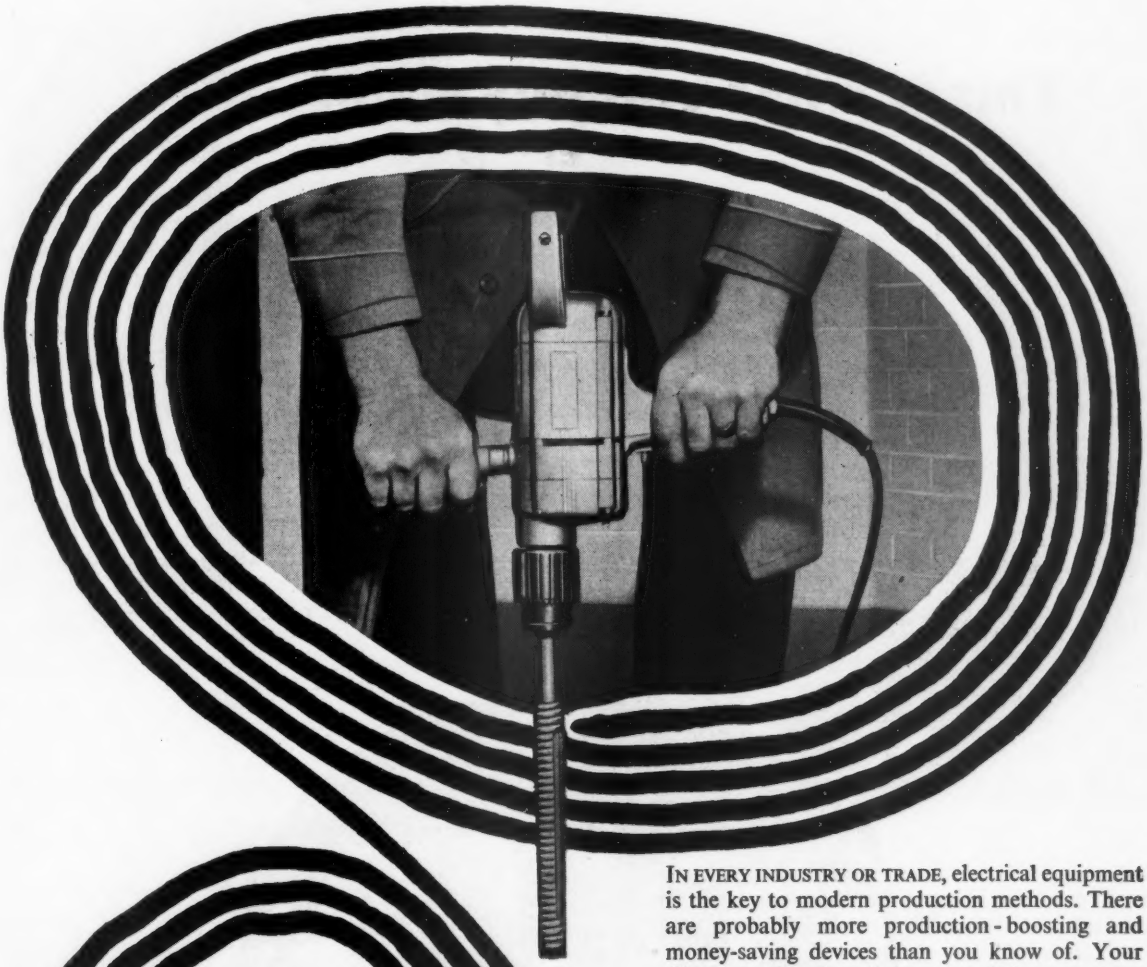
RESINOUS CHEMICALS LIMITED

BLAYDON · COUNTY DURHAM

Telephone : Blaydon 347-8

'Grams : Reschem, Blaydon-on-Tyne

Having a hand in Productivity



Drilling for—Rag Bolts!

It sounds strange. But most of us have seen a rag bolt even if we haven't recognised it. Machinery on a concrete floor, bolted down. The bolts embedded in the concrete are rag bolts. In the old days it was a case of a man with hammer and chisel—laboriously and slowly chipping the concrete until the holes were large enough and deep enough. Now one man takes an electric drill, and drills *the holes; just like that. (Productivity!) Faster? Fifty times—a hundred! But the electric drill is ONLY ONE OF THE MANY AIDS TO PRODUCTIVITY THAT ELECTRICITY CAN BRING YOU.*

The British Electrical Development Association
2 Savoy Hill, London, W.C.2.

IN EVERY INDUSTRY OR TRADE, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry—produced by the Electrical Development Association.

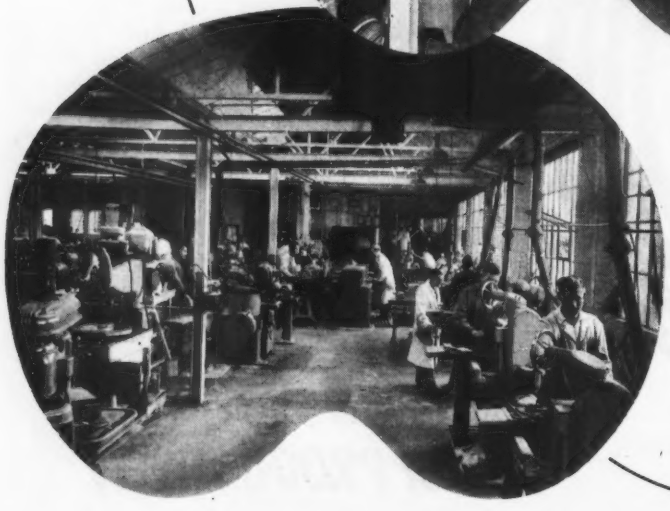
E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free) and the Electricity Boards (or E.D.A. themselves) can supply you.

Electricity a Power of Good for PRODUCTIVITY

This is what you buy from us

When you buy a moulding tool you must place the order *before* you see the goods. Which means that you must take your toolmaker largely on trust. That is why we print these photographs of our design office and workshops — to show you what manner of firm we are.

If you care to call on us we will show you these facilities in the flesh, so to speak. Then you can judge for yourself. All we can say now is that nothing but the best tool-making will satisfy us—or be given to you. It's a matter not only of pride, but of experience.



TOOL MAKERS ASSOCIATION GALLE MEMBER

Universal Tools Ltd

TRAMWAY PATH, MITCHAM, SURREY

Telephone: MITcham 1624

simple or intricate . . .

Simple coil winding bobbin or intricate high-precision part . . . whatever the job, we have the skill, experience and equipment to mould it accurately—in the most suitable plastic material. Our modern moulding shops are now among the largest in Europe. We can turn out injection mouldings of every description from the smallest to the largest. By replacing fabricated parts our mouldings have reduced manufacturing costs in scores of industries. It's more than likely we could save you money too! If you've a problem where a plastic moulding might help—*consult us.*

Here are some of the materials we handle . . .

THERMOSETTING

Phenol Formaldehyde,
Urea Formaldehyde

THERMOPLASTIC

Cellulose Acetate, Cellulose Acetate Butyrate, Polymethylmethacrylate, Polystyrene including heat resisting and high impact grades, Nylon. **Flexible plastics:** Polyethylene, Polyvinylchloride

and here are a few of the processes we use . . .

COMPRESSION MOULDING

TRANSFER MOULDING

THERMOPLASTIC INJECTION MOULDING

THERMOPLASTIC BLOW MOULDING

Polyethylene bottles and other containers

FRASER
and
GLASS
the plastics people

WOODSIDE LANE, LONDON N.12
(HILLSIDE 2224-5)

You'll be glad it's

There is a wide range of specially designed G.E.C. fluorescent fittings for every trade and industry. Simple to fit. Snap-action dismantling for quick, easy one-man maintenance. Consult your local contractor for best type of G.E.C. fitting . . . with of course Osram tubes.

G.E.C.

● *The General Electric Co Ltd, Magnet House, Kingsway, London WC2*

TEST OF ENDURANCE

Frankly, we despair of ever making our Immortal Visitors understand the exact purpose of the exceptionally rigid tests to which "Nestorite" Moulding Powders are subjected at *every* stage.

For instance, Venus imagined our Shrinkage Test had something to do with personal slimming, while Bacchus was under the impression that our Cup Test was a sort of drinking competition.

Only Hercules shows a glimmering of common sense. True, he prowls round our premises in search of a seven-headed serpent of the same type as the Hydra he slew so long ago, but we are gradually converting him to the belief that such creatures (like "Pink Elephants" and "Green Rats") are mostly the result of Bacchanalian revels in places known as "locals".

Being an individual of such resource and strength—ready to turn to anything (as evidenced by his colossal labours recorded in Mythological History), we visualise a host of jobs he is suitable for in our Works.

We hope to report on his progress in our future announcements.

Typical 'Nestorite' Tests:

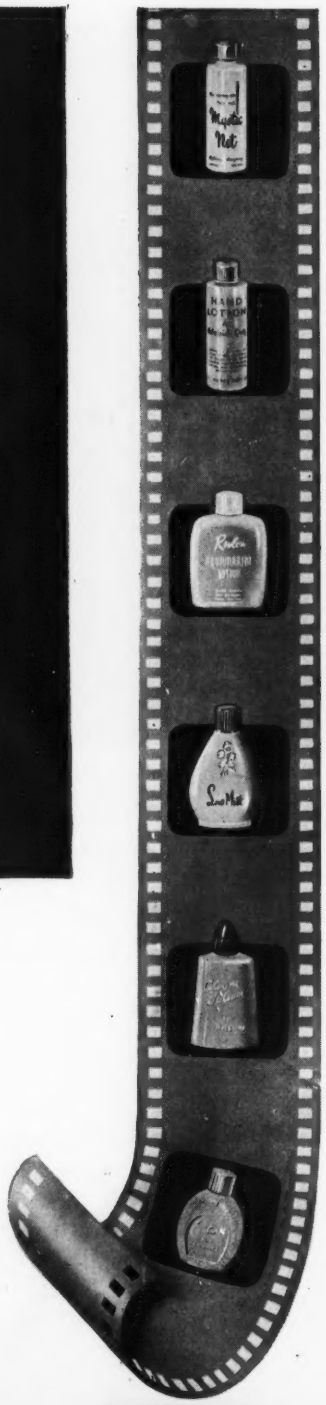
Cup Flow
Impact Strength
Tensile Strength
Surface Resistivity
Breakdown Strength
Water Absorption
Shrinkage
Colour

RX YOU'RE RIGHT WITH 'NESTORITE'

JAMES FERGUSON & SONS LTD.
LEA PARK WORKS, PRINCE GEORGE'S RD., MERTON ABBEY, LONDON, S.W.19
Telephone: MITCHAM 2283 (5 LINES) Telegrams: NESTORIUS SOUPHONE LONDON

A. S. HARRISON & CO. PTY. LTD.,
85, Clarence St., Sydney, Australia.
120, Wakefield St., Wellington, New Zealand.
ANDRE BERJONNEAU,
134, Avenue de Villiers, Paris 17, France.
JOSE DELCLOS MOLLERA,
Angel Baixeras, 39, Barcelona (2), Spain.
EINAR HOLMARK, 19, Gl. Kongevej,
Copenhagen V, Denmark.

C



Du Lundi "Body Mist" in its glamour-styled Poly-Tainer. Lovely shapes and colours abound in the range of unbreakable, flexible Poly-Tainers we make for the cosmetic and other industries. Yardley, Revlon, Goya and I.C.I. are just a few of our customers who realise the very great advantages of packaging in polythene. We have puffers, sprayers, special pourers and a wonderful variety of cream jars, lotion bottles, etc. from the largest range of stock moulds in the world. Complete consultation service available for design, tooling, manufacture and permanent printing of polythene containers. That's our line!

Distributed by:

INDUSTRIAL APPLIANCES LTD.

21/22n GROSVENOR STREET · LONDON · W.1 *Telephone: GROsvenor 5249, 5680 (P.B.X.)*

Manufactured by: E. Shipton & Co. Ltd., Ferndown Works, Northwood Hills, Middx. *Telephone:* PINNER 1103/5 (P.B.X.)

CRAYMAC brings a new range in

Texturised finishes

They give that silky, luxurious look that's the basis of the new glamour in rainwear. In six muted shades the new Craymac P.V.C. sheeting is really strong—can be welded or sewn and styled at will.

WRITE NOW FOR PATTERN FOLDER

Rainwear stylists and users of P.V.C. sheeting are invited to send for a new shade folder. Samples of all shades and gauges in translucent, opaque, metallic or laminates gladly sent on request.

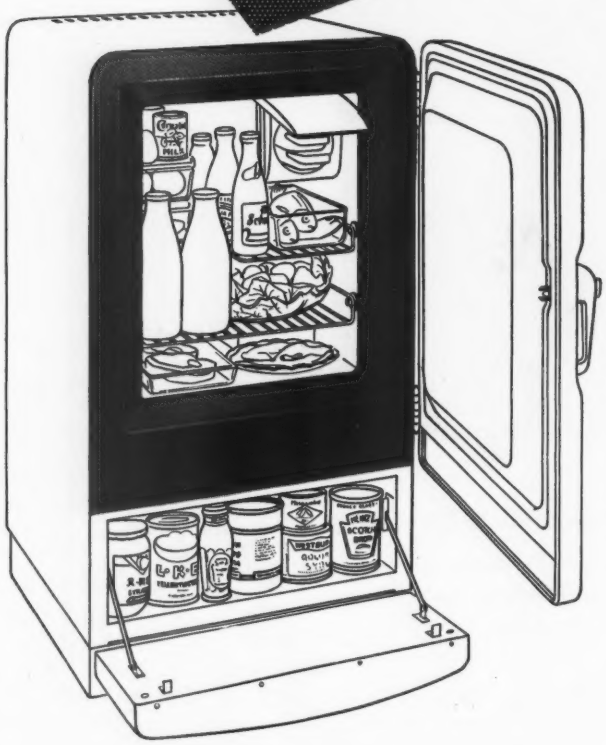
THE GREENWICH LEATHERCLOTH CO. LTD.
St. Mary Cray, Kent, England.
Telephones · Ravensbourne 4674/5 & Orpington 5671.

'Craymac' is manufactured to British Standards Institute Specification No. 1763 by one of Britain's largest producers of P.V.C. sheeting.

Serial No ★ 1923
BRITISH
GOOD HOUSEKEEPING INSTITUTE
GUARANTEES
REFUND OF MONEY OR REPLACEMENT IF NOT IN CONFORMITY WITH THE INSTITUTE'S STANDARDS

A Greenwich PRODUCT

Erinoid POLYSTYRENE
M·H·I GRADE



The trim in the new Astral refrigerator is in Erinoid polystyrene, M.H.I. grade, and is produced by E. K. Cole Ltd. (Plastics Division) for the refrigerator makers, Astral Equipment Ltd.

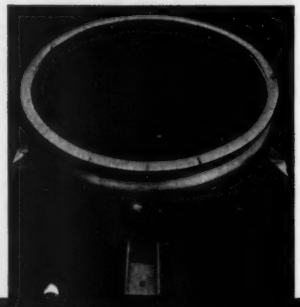
Erinoid polystyrene, M.H.I. grade, is a tough copolymer-type material with an impact strength 100% higher than general purpose polystyrene. M.H.I. grade is particularly suitable for all refrigerator fittings. Erinoid polystyrene is available as moulding powder, sheet and extruded sections.

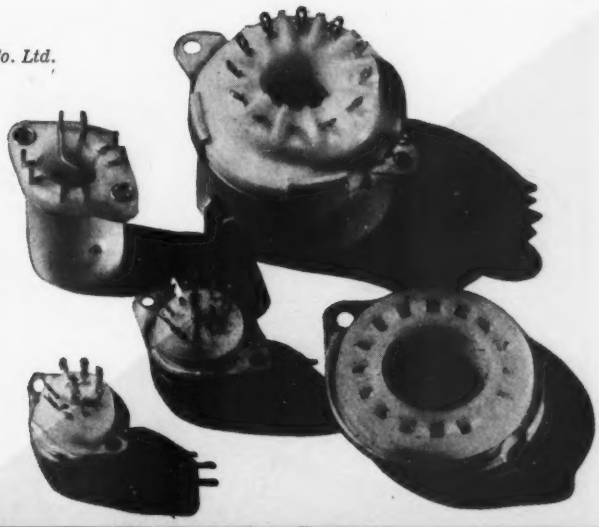
Erinoid polystyrene is manufactured by
STYRENE PRODUCTS LIMITED

Full information, samples, prices etc. on request to Marketing Agents:
ERINOID LIMITED · STROUD · GLOUCESTERSHIRE
Telephone: Stroud 810
London Office: 96 PICCADILLY · LONDON · W1 · Telephone: GROsvenor 7111

Valve holders by The Edison Swan Electric Co. Ltd.

4 ft. 'Fluolion' gasket by James Walker & Co. Ltd. for Enamelled Metal Products Corp. (1933) Ltd.





Remarkable

'Fluon' p.t.f.e., often referred to as the 'noble plastic', is unaffected by all known chemicals, except fluorine and molten alkali metals, over a temperature range of -80° to 250°C. It possesses outstanding resistance to heat, unusually good insulating properties even under very humid conditions, and is chemically stable and non-toxic. A wide variety of applications has already been found for 'Fluon' from special purpose valve holders to non-stick bakery rollers, from gaskets and packings for chemical plant to insulation for high frequency cables.

Bakery rollers covered by Dunlop Rubber Co. Ltd., G.R.G. Division for Thomas Barker and Sons Ltd.

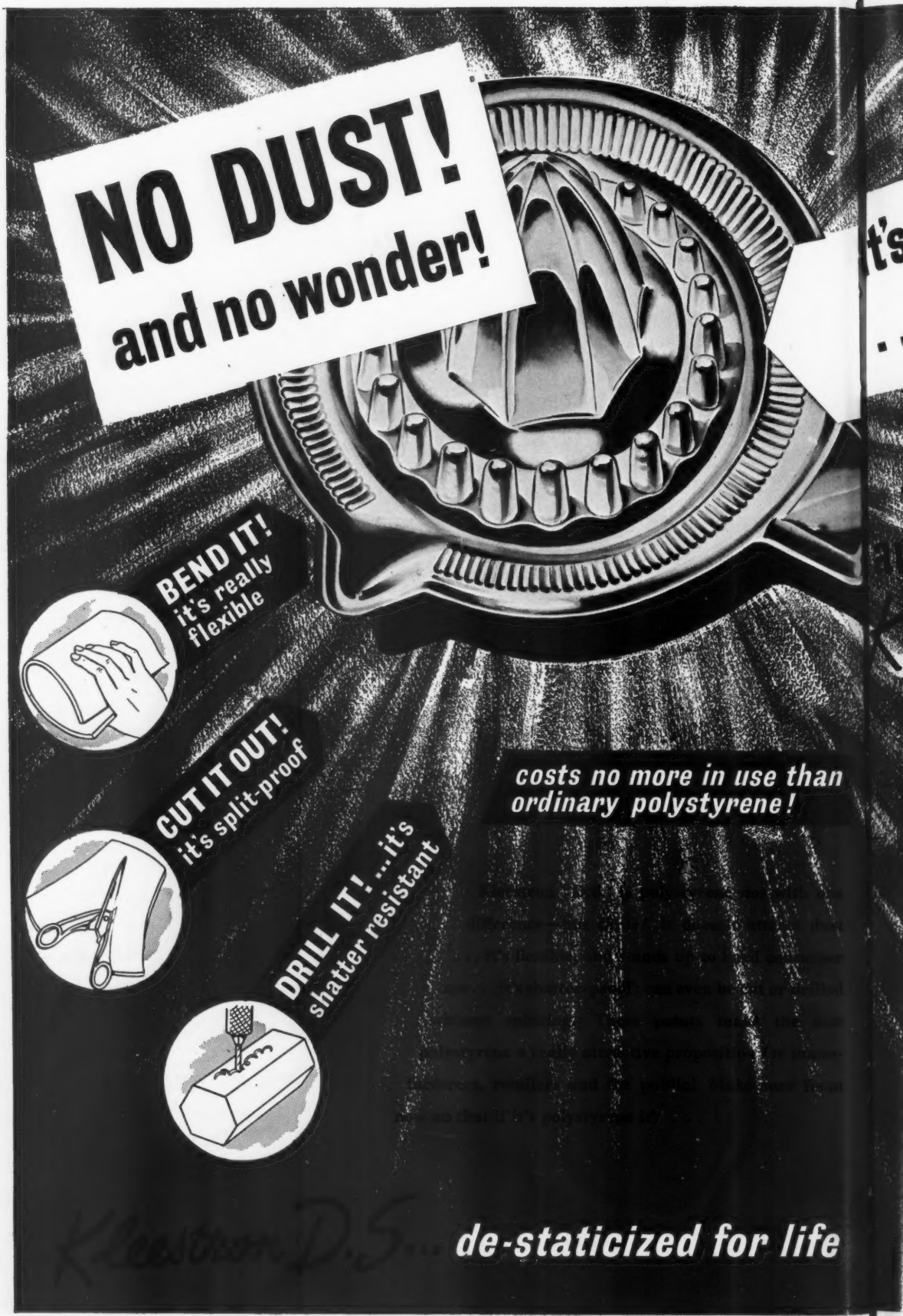
Tubular condensers by The Telegraph Condenser Co. Ltd. Patent Nos. 698607 and 698608.

'FLUON' — **FOR THE EXCEPTIONAL JOB**

'Fluon' is the registered trade mark of the polytetrafluoroethylene manufactured by I.C.I.

IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1.

P.570


NO DUST!
and no wonder!
BEND IT!
it's really
flexible
CUT IT OUT!
it's split-proof
DRILL IT! ...it's
shatter resistant
costs no more in use than
ordinary polystyrene!
de-staticized for life

...it's POLYSTYRENE de-staticized

...it's Kleestron D.S.

- is tougher than ordinary polystyrene, yet as flexible as cellulose acetate.
- is de-staticized *for life*, and cannot attract or hold dust particles.
- has the same impact strength as ordinary polystyrene, yet has a lower (but adequate) tensile strength.
- has improved ductile qualities which permit the moulding of undercuts, threads and inserts which would normally be extremely difficult.
- is an opaque white material in its natural state, and *costs no more in use than ordinary polystyrene.*

No Modifications Needed in Machine or Mould

As Kleestron 'D.S.' flows at lower temperatures than normal, a range of 350/500°F is recommended. Higher temperatures are likely to cause discoloration. A reduction of 50°F in the cylinder temperature, together with an increase in pressure gives optimum results, and mould release is improved. In certain cases it may be possible to reduce cycle times.

Kleestron D.S.

BRIDGE

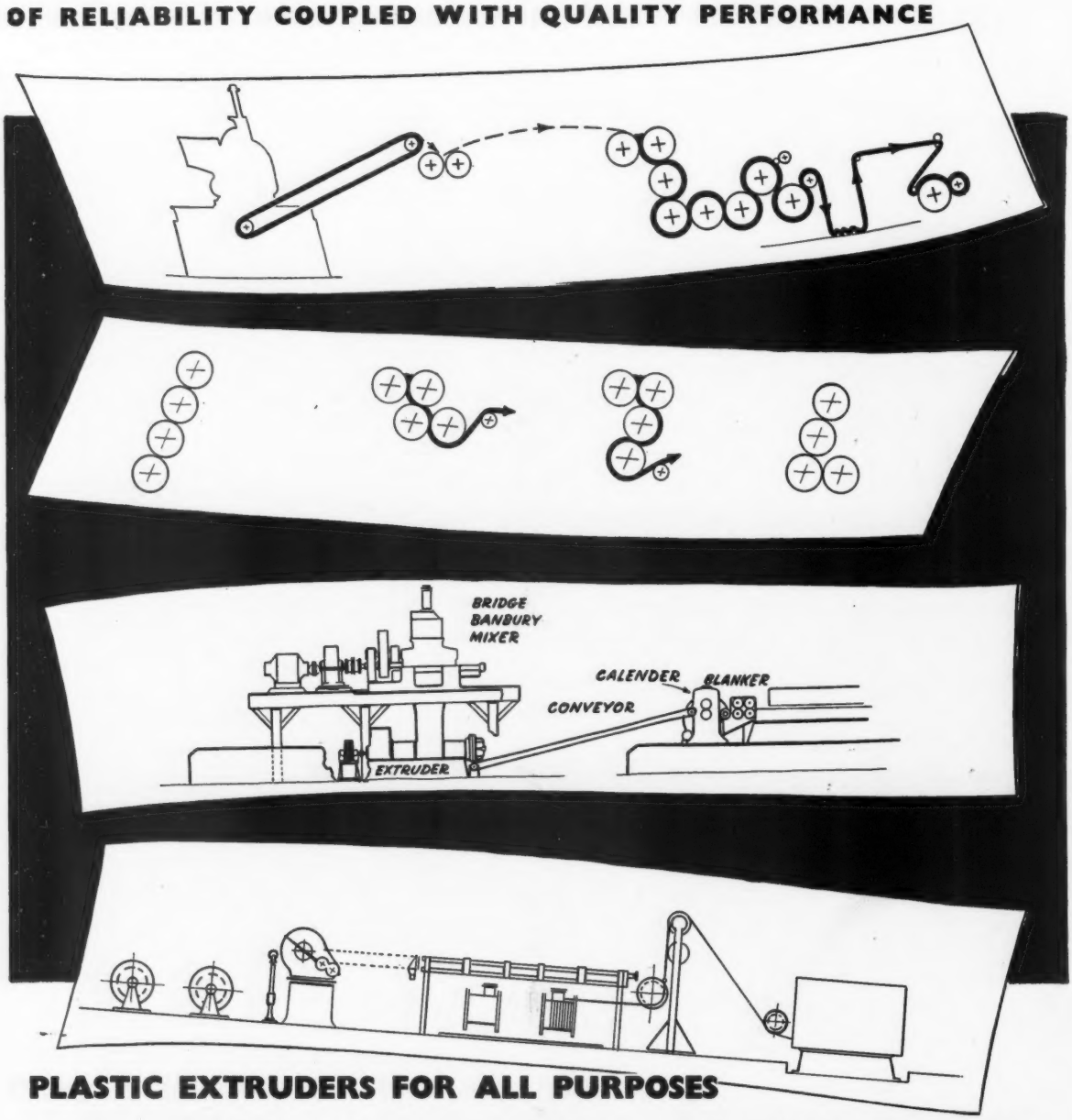
Specify the best and be satisfied

FOR

PRECISION

PLASTICS MACHINERY

OF RELIABILITY COUPLED WITH QUALITY PERFORMANCE



PLASTIC EXTRUDERS FOR ALL PURPOSES

DAVID BRIDGE & Co LTD CASTLETON, ROCHDALE, ENGLAND.

Specialist Engineers to the Rubber, Plastics and Associated Industries

LONDON OFFICE, BROUGHTON HOUSE, 6, 7, 8, SACKVILLE ST., PICCADILLY, W.1.

KLEESTRON

Colorant Blend 604

the *VERSATILE* plastic

Talk plastics from London to Lagos, Birmingham to Brisbane, and very soon the topic will be polystyrene—cheapest, lightest, most adaptable moulding material. Talk polystyrene . . . and pretty soon you'll hear mention of Kleestron Colorant Blend 604. This most versatile of plastics is supplied as granules, fines or a mixture of both—each type eminently suitable for both dry colouring and extruded colouring.

Kleestron 604 pouring from a Hopper during a late stage of production.

All enquiries to—

KLEESTRON LIMITED

WEST HALKIN HOUSE · WEST HALKIN STREET · LONDON SW1 · ENGLAND

Cables; KLEEMABRO · LONDON Telephone: SLOane 0866

D

When it's a question of

I·N·S·U·L·A·T·I·O·N

ask for "ASHLAM" Laminates

"ASHLAM" Laminates are produced from paper, cotton fabric and fibreglass base materials. The fibreglass grades are bonded with Silicone, Melamine, Phenolic and Polyester type resins, and have very high dielectric and insulation properties.

"ASHLAM" Laminates are also available in the form of tubes with fibreglass base bonded with Polyester and Silicone resins.

ask Ashdowns

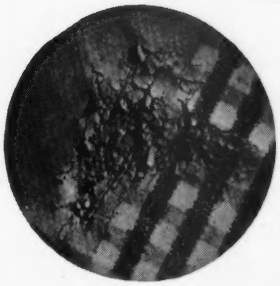
A S H D O W N S L I M I T E D

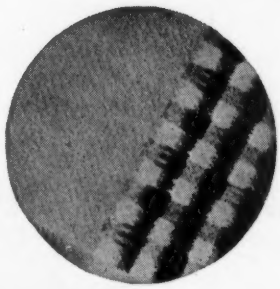
ECCLESTON WORKS, ST. HELENS, LANCASHIRE • TELEPHONE: ST. HELENS 3206

Ashdowns Limited is a subsidiary of Pilkington Brothers Limited
"ASHLAM" is the registered trade mark of Ashdowns Limited

5 SECONDS

TO PROVE THE FLEX CRACKING RESISTANCE OF GEON PVC





This simple hand flexing test shows the superiority of Geon PVC* over other fabric-coating materials.

Take a strip of conventional American cloth for example, and grip firmly between the tips of fingers and thumbs—as shown—with the thumbs a quarter of an inch apart. Move the right hand with a steady circular motion so that the coated surface of the material is scrubbed against itself. After only 10 turns (5 seconds) the coating will start to crack and flake, exposing the fabric beneath.

Repeat, using fabric coated with Geon PVC—no cracking, no flaking—and prove to yourself its superiority by this test. Thus fabrics coated with Geon PVC have longer life, take harder wear, give greater customer satisfaction—three selling points which are equally true of the many other products made with Geon PVC.

For more information about Geon PVC write for free descriptive Booklet No. 51.

BRITISH GEON LTD

SALES & TECHNICAL SERVICE

DEVONSHIRE HOUSE, PICCADILLY, LONDON, W.1 TEL: MAYFAIR 8867

Geon
Polyvinyl Materials

*'Geon' is a Registered Trade Mark

Ebonestos are Proud —

that their reputation has earned for them the privilege of supplying the following world-famous undertakings with high-precision plastic mouldings :

Admiralty.
Admiralty Compass Observatory.
Air Ministry.
Electricity Boards.
General Post Office.
Ministry of Supply.
Allen West & Co. Ltd.
Arrow Electric Switches Ltd.
Artic Fuse & Electrical Mfg. Co. Ltd.
Automatic Coil Winder & Electric Equipment Co. Ltd.
British Mechanical Productions Ltd.
British Thomson-Houston Co. Ltd.
Bryce Ltd.
A. C. Cossor Ltd.
Crompton Parkinson Ltd.
Denis Ferranti Meters Ltd.
Dewrance & Co. Ltd.
" Diamond H " Switches Ltd.
Enfield Clock Co. (London) Ltd.
English Electric Co. Ltd.
Ferranti Ltd.
Griffin & Tatlock Ltd.
Hoover Ltd.
Johnson & Phillips Ltd.
K.D.G. Instruments Ltd.
Max Factor & Co. Inc.
Metropolitan-Vickers Elec. Co. Ltd.
Muirhead & Co. Ltd.
Negretti & Zambra Ltd.
Nettlefold & Moser Ltd.
New Switchgear Construction Co. Ltd.
Parmiter Hope & Sugden Ltd.
R. B. Pullin & Co. Ltd.
Reeves & Sons Ltd.
A. Reyrolle & Co. Ltd.
Ross Ltd.
Simplex Electric Co. Ltd.
Siemens Bros. & Co. Ltd., London
J. Stone & Co. (Deptford) Ltd.
The Britmac Electrical Co., Ltd.
The Horstmann Gear Co. Ltd.
The Plessey Co. Ltd.
The Strand Electric & Engineering Co. Ltd.
The Tintometer Ltd.
Trix Ltd.
J. H. Tucker & Co. Ltd.
Turnright Controls Ltd.
Vauxhall Motors Ltd.
Venner Ltd.
Westinghouse Brake & Signal Co. Ltd.
Winsor & Newton Ltd.

If it's mouldable — Ebonestos can mould it

EBONESTOS INDUSTRIES LTD.

EST. 53 YEARS

MOULDERS IN ALL PLASTIC MATERIALS AND EBONESTOS SPECIAL COMPOSITIONS

EXCELSIOR WORKS, ROLLINS STREET, NEW CROSS, LONDON, S.E.15

New Cross 2080 (20 lines)

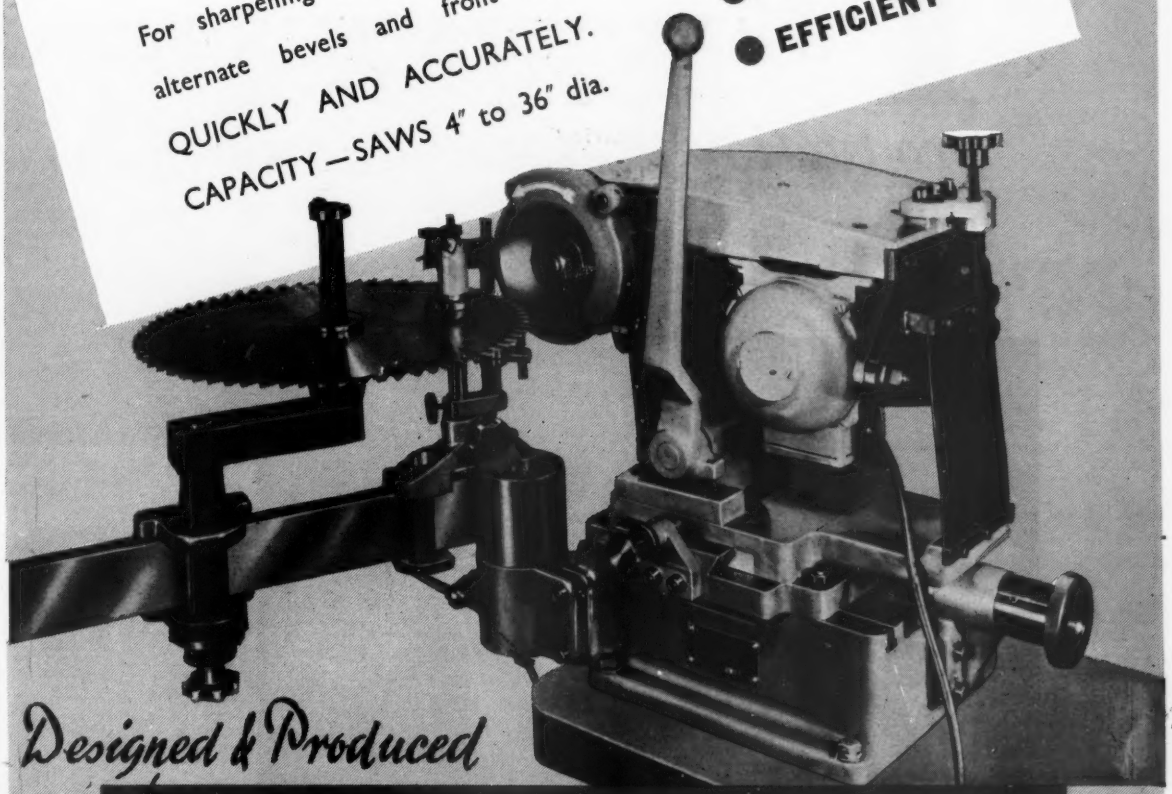
MORE IMPORTANT THAN EVER

A SHARPENING MACHINE

"MITIA" FOR CARBIDE TIPPED SAWS

For sharpening straight top teeth, alternate bevels and front faces QUICKLY AND ACCURATELY.
CAPACITY—SAWS 4" to 36" dia.

- ECONOMICAL
- RAPID
- ACCURATE
- EFFICIENT



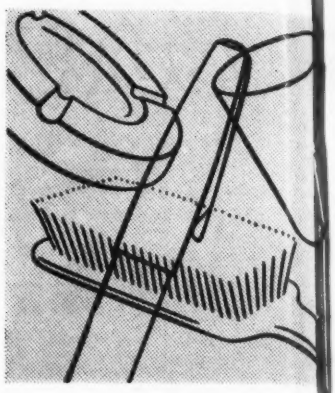
Designed & Produced by

F B T

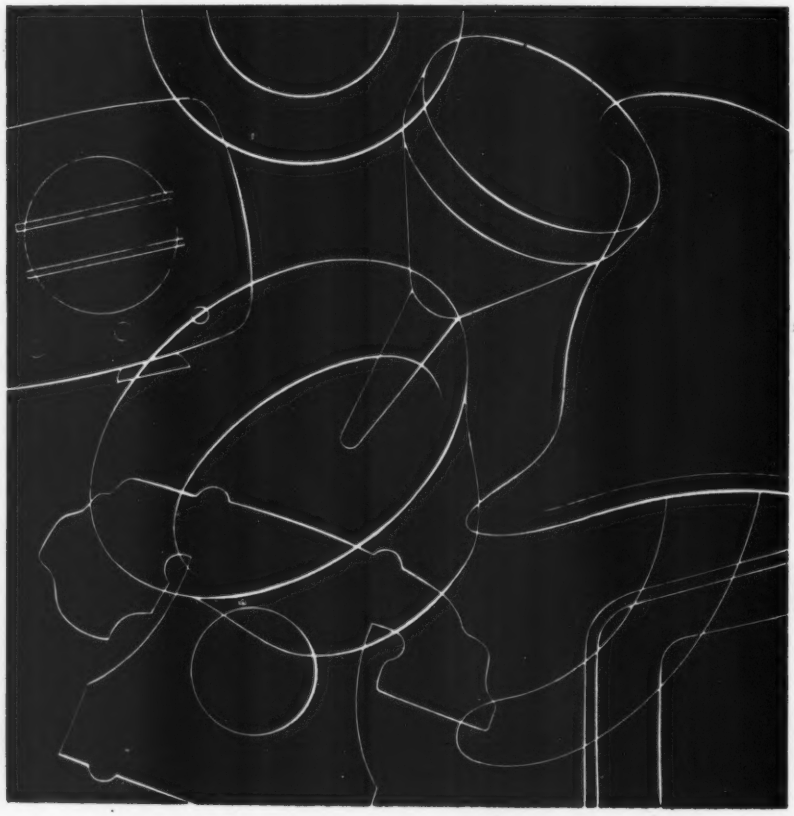
FIRTH BROWN TOOLS LTD.

SPEEDCUT WORKS, CARLISLE STREET EAST,

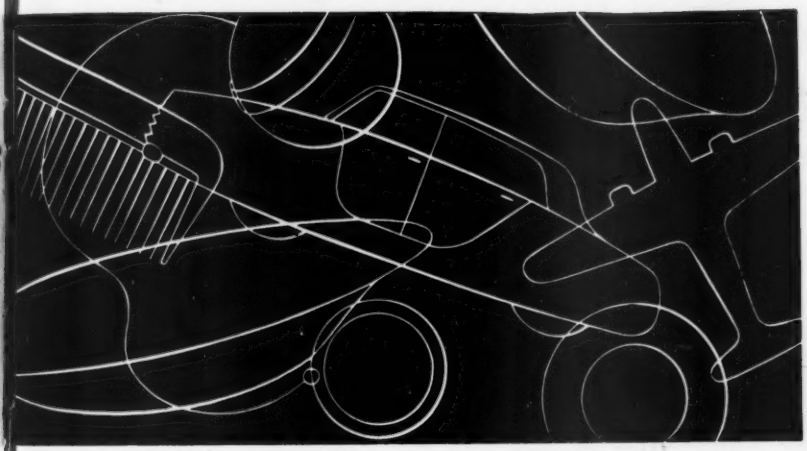
SHEFFIELD, ENGLAND



First step to profitable plastics production... Monsanto raw materials



Monsanto's original research made a considerable contribution to the development of phenol and its components in the plastics industry. Because of this — and because Monsanto made these materials available in bulk and at consistently high standards of quality—the industry's chemists have been able to advance many new uses and improve existing ones. Monsanto's phenol production serves the industry with a large part of its raw material requirements. Monsanto's road-tanker fleet ensures that a first-class service is maintained — that Monsanto phenol is delivered promptly, in bulk and "freshly-distilled". Write for full information.



Monsanto products include :

PHENOL, MALEIC ANHYDRIDE
PHTHALIC ANHYDRIDE, para CRESOL
meta CRESOL, AROCLORS, LUSTREX**
PHTHALATE ESTERS

(* Registered Trade Marks)

MONSANTO CHEMICALS LIMITED

603 Victoria Station House, Victoria Street, London, S.W.1

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Ltd., Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Ltd., Bombay. Representatives in the world's principal cities.

MONSANTO

R.H.C. PRODUCTS

THE SYMBOL OF SERVICE

A Most Comprehensive Range of Raw Materials for the Plastics Industry

As Specialists of long standing in raw materials for Plastics we feel the time has come to list briefly our range of products. The range, always comprehensive, has increased recently to a remarkable extent in pace with the latest technical developments.

PRODUCT	PROPERTIES & USES
STYRON 475 SHEETING	For forming by conventional methods.
CELLULOSE ACETATE MOULDING POWDER	In a range of colours for injection moulding.
METHYL METHACRYLATE POLYMERS & MONOMER	Glass clear, light stable, inert. For surface coatings and dental purposes.
VINYL CHLORIDE POLYMERS AND CO-POLYMERS	Compounds for calendering, injection and extrusion.
CELLULOSE ACETATE BUTYRATE MOULDING COMPOUNDS	Injection and extrusion.
DEWAXED SHELLAC	Finest bleached and gold-orange qualities guaranteed wax free.
ORGANIC PEROXIDES AND PER-ACIDS	Polymerisation Catalysts.
STYRENE MONOMER	Glass clear, light stable. Heat sensitive. For Polymerisation, laminating and sealing compounds, co-polymers, etc.
CELLULOSE ACETATE FLAKE	For the manufacture of moulding powders, lacquers, strippers, foils and sheeting.
ADHESIVES	For Plastics.

PRODUCT	PROPERTIES & USES
RHC POLYSTYRENE **KLP General Purpose** **HS Heat Resistant** **2CL High Molecular Weight** **MHI Medium Impact and HI High Impact** **2CL/HS High Molecular Weight, Heat Resistant** **MHI/HS Medium Impact, Heat Resistant**	For injection and compression moulding and extrusion.
POLYAMIDE MOULDING COMPOUNDS	For injection and extrusion.
POLYAMIDE FOILS	For industrial and domestic packaging.
POLYURETHANE MOULDING COMPOUNDS	For extrusion and injection for articles having high mechanical qualities.
ACETO BUTYRATE FOIL (ELECTRICAL INSULATING)	For cable and wire wrapping. Insulating.
CRESOLS AND XYLENOLS	A wide range of pure and mixed isomers.
THERMOCHROM CRAYONS (TEMPERATURE INDICATORS)	Temperature indicators for machinery heating systems, etc. Rapid and distinct colour change.
THERMOCOLOUR POWDERS	Uses as above. Soluble in industrial methylated spirit.

TRADE GRINDING AND RECLAMATION SERVICE. Complete modern equipment, particularly adapted for the requirements of the Plastics Industry.

In addition to our own manufacturing activities we are Concessionaires for twenty manufacturers of highest repute at home and abroad, thus, in effect, all products are supplied by us at FIRST HAND.

R. H. COLE & COMPANY LTD

2 CAXTON STREET · WESTMINSTER · LONDON · SW1

Telephone : ABBey 3061 (10 lines) Telegrams : GERATOLE, PHONE, LONDON

EXTRUSION

The R.C.100 twin-screw machine is a medium capacity extruder with a nominal output of 100 lb. per hour and will operate continuously over long periods, producing tubes, rods and sections in thermoplastic materials. Coated cables, rods and tubes are standard jobs.

INJECTION

The dependable S.H.3/10 injection moulding machine will produce up to 10-12 oz. per shot. Large mould plates and a 300-ton lock ensures a wide productivity range.

LEATHERHEAD RD., SOUTH CHESSINGTON, SURREY
Telephone: Epsom 5631 Telegrams: "WINPLAS" Surbiton, Surrey
London Office: 49 Upper Brook St., London, W.1. Telephone: Mayfair 9020

R.H. Windsor LTD

The distinctive merits of STERNITE

STERNITE moulding materials and synthetic resins have become established as of outstanding quality : they are available in a wide range of grades and types, many specially evolved to meet customers' requirements.

★ Excellent quality

★ Immediate delivery by our transport

★ Considerable price advantages

★ Personal attention

★ Expert Technical Service

STERNITE **Phenolic Moulding Powder**

FOR COMPRESSION AND TRANSFER MOULDING

General Purpose Grades : (Types G and GX) conforming to B.S.S. 771	All of exceptional quality for their particular applications and in a range from which it is possible to meet any specification with absolute confidence.	
Other Grades available include :	Shock resisting Water resisting High dielectric Telephone Grade 1	Heat resisting Acid resisting Cabinet Odourless, etc., etc.

STERNITE **Synthetic Resins**

for wood, paper and fabric base laminates suitable for decorative, electrical and mechanical purposes.

also available : Novolak Resins for Moulding Powders, Liquid Resins for Grinding Wheels, etc.

Sterling

MOULDING MATERIALS LTD.

A.I.D., M.O.S., POST OFFICE, ADMIRALTY APPROVED
B.S.I. HALL-MARK CERTIFIED

S7

STERLING MOULDING MATERIALS LTD., STERLING HOUSE, HEDDON STREET, LONDON, W.1. *Works : STALYBRIDGE, CHESHIRE*
Phone: Grosvenor 5301/10 Grams: Stermold, Piccy, London Cables: Stermold, London

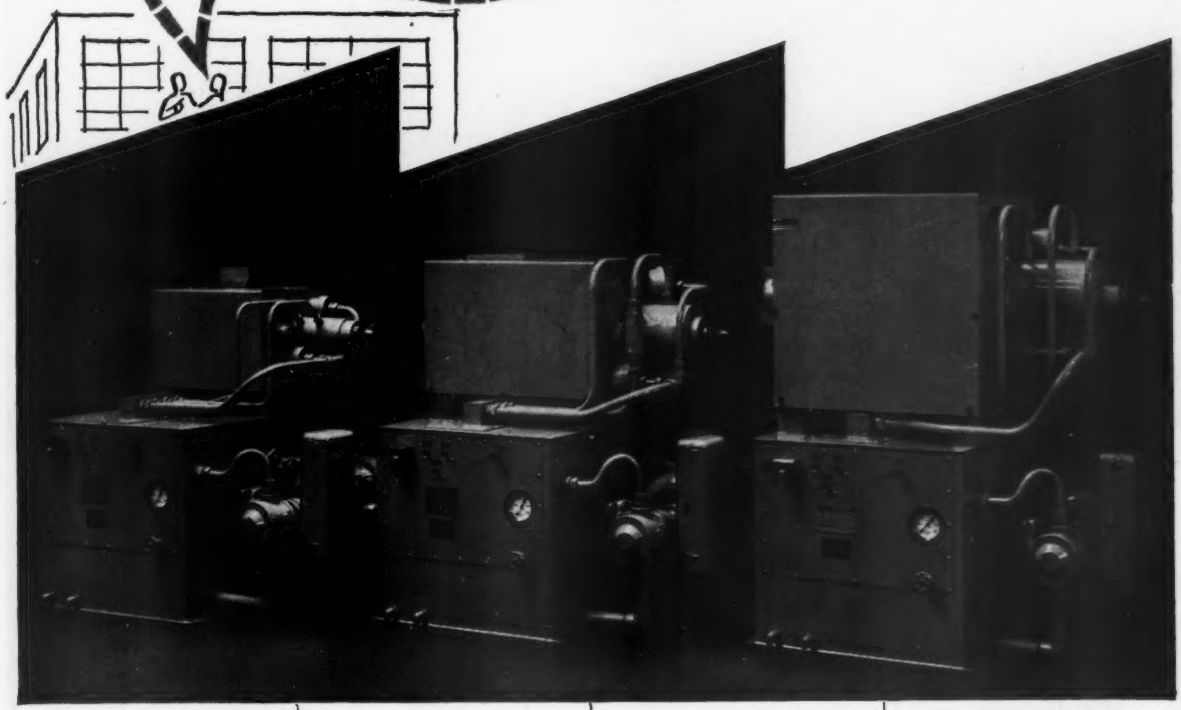
Members

It's no trouble at all with

BIPEL

Horizontal Hydraulic Pelleters

The advantages of hydraulic pelleting combined with the speed of a mechanical pelleter and minimum maintenance requirements . . . that is BIPEL'S contribution to the job of making sound moulding preforms and making them quickly. How is it done? By using the main ram for compressing the powder only; filling and ejecting depend on rapid movements of the die and hopper.



	12 TON	**35** TON	**70** TON
Maximum dia. of pellet	1¼″	3″	4½″
Maximum strokes per hr.	2280	1260	720
Maximum fill	2″	3¼″	3¼″
Overall dimensions	4′ 6″ x 3′ 6″ x 5′ 3″ high	4′ 6″ x 3′ 6″ x 6′ high	4′ 6″ x 3′ 6″ x 6′ 9″ high
Weight	20 cwt.	30 cwt.	35 cwt.

IN HYDRAULIC PELLETING, powder is compressed not by a blow as in a mechanical pelleter, but by a steady squeeze. In the BIPEL pelleter both the pressure 'dwell' and the amount of pressure applied can be accurately adjusted in a few seconds to suit the powder being pelleted. These in themselves are advantages: but there are others, for example:

1 No moving parts come between the punches, so the machine cannot suffer damage.

2 There is no powder spillage because filling takes place *in* the hopper.

3 The die is free during the squeeze so that the action is equivalent to applying pressure to both punches. This gives consistent density.

4 The maximum pressure cannot be exceeded so that there is no danger of a major breakdown due to the machine being over-stressed.

5 Adjustment of pellet weight is very simple and can be made while the machine is running.

6 Round, square, rectangular, and ring pellets, etc., can also be made.

7 Multiple punches can be fitted within the pressure capacity of each machine to increase production.

8 An auxiliary hopper with motorised agitator can also be fitted to feed very fine powder and semi-shock resisting materials.

The machine is completely self-contained with its own motor and pump (shop air supply is used for the controls). Since pressure only builds up during the squeeze and ejection, the motor is running light most of the time. Power consumption is remarkably small and maintenance charges are low.

Invest in* BIPEL *Hydraulic Moulding Plant

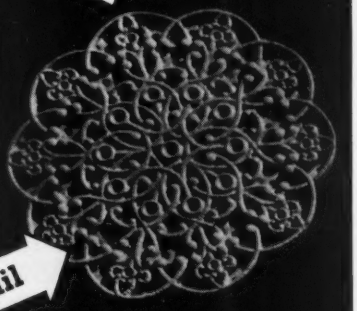
B.I.P GROUP

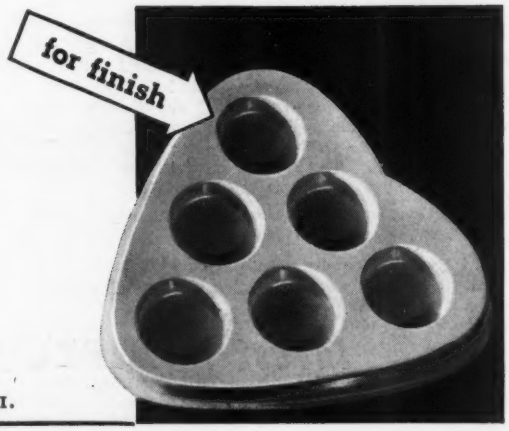
B.I.P. ENGINEERING LTD., STREETLY WORKS, SUTTON COLDFIELD, ENGLAND

Six advantages for Vacuum forming with 'Cellastine' Acetate Sheeting

1. Accurate reproduction of mould detail.
2. Generous depth of draw.
3. High lustre finish.
4. Choice of colours or transparent.
5. Economical Production.
6. Quick cementing.

'Cellastine' is tough, resilient, lightweight, washable and printable.





'Cellastine'
TRADE MARK

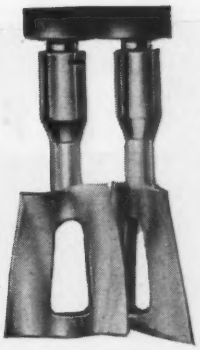
Acetate Sheeting

Demonstrations can be arranged by appointment. Enquiries to:

BRITISH CELANESE LIMITED

Plastics Division Celanese House, Hanover Square, London, W.1.

How can the TRUE MIX assist your production?



BEKEN Planetex Vertical Mixers have enabled many manufacturers to process their materials more economically than has hitherto been possible and with surprising improvements in the quality of the product. Among many examples are the following :—

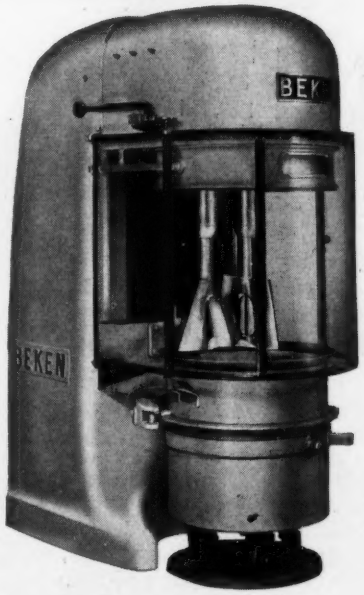
SUBSTANTIAL REDUCTIONS IN PRODUCTION TIMES. Emulsion paint comprising pigment and emulsion completed in 20 minutes; asbestos powder or short fibres mixed with cement in 10 minutes.

WHOLE PRODUCTION STAGES ELIMINATED. Pyrotechnical compounds hitherto milled after mixing now completely processed in mixer in one-third of the usual time, with a marked improvement in quality.

ACCEPTED LIMITATIONS REMOVED. Stiff doughs, light pastes and even powders are all mixed with an efficiency unequalled by existing mixers; smooth creams and uniform pastes and doughs obtained free from lumps or balling; performance consistently uniform.

FINAL PRODUCT IMPROVED. P.V.C. plasticised more rapidly and uniformly than hitherto possible in a mixer alone; cotton fibre completely dispersed in cellulose acetate dope—searching tests of the mixer's efficiency and versatility !

These are examples of actual manufacturing problems which have been simplified by Beken Planetex Mixers. Generalisations are always inadvisable, but what is being performed for others may be possible with your own products. Why not permit us to carry out a mixing test with your materials, in confidence, and show what TRUE MIXING can save you.



THE BEKEN MIX is the TRUE mix

"PLANETEX" VERTICAL MIXERS
Sizes from 5 to 100 gallons
"DUPLEX" HORIZONTAL MIXERS
Sizes from 155 c.c. to 500 gallons

Sole Distributors :

LAVINO (LONDON) LIMITED

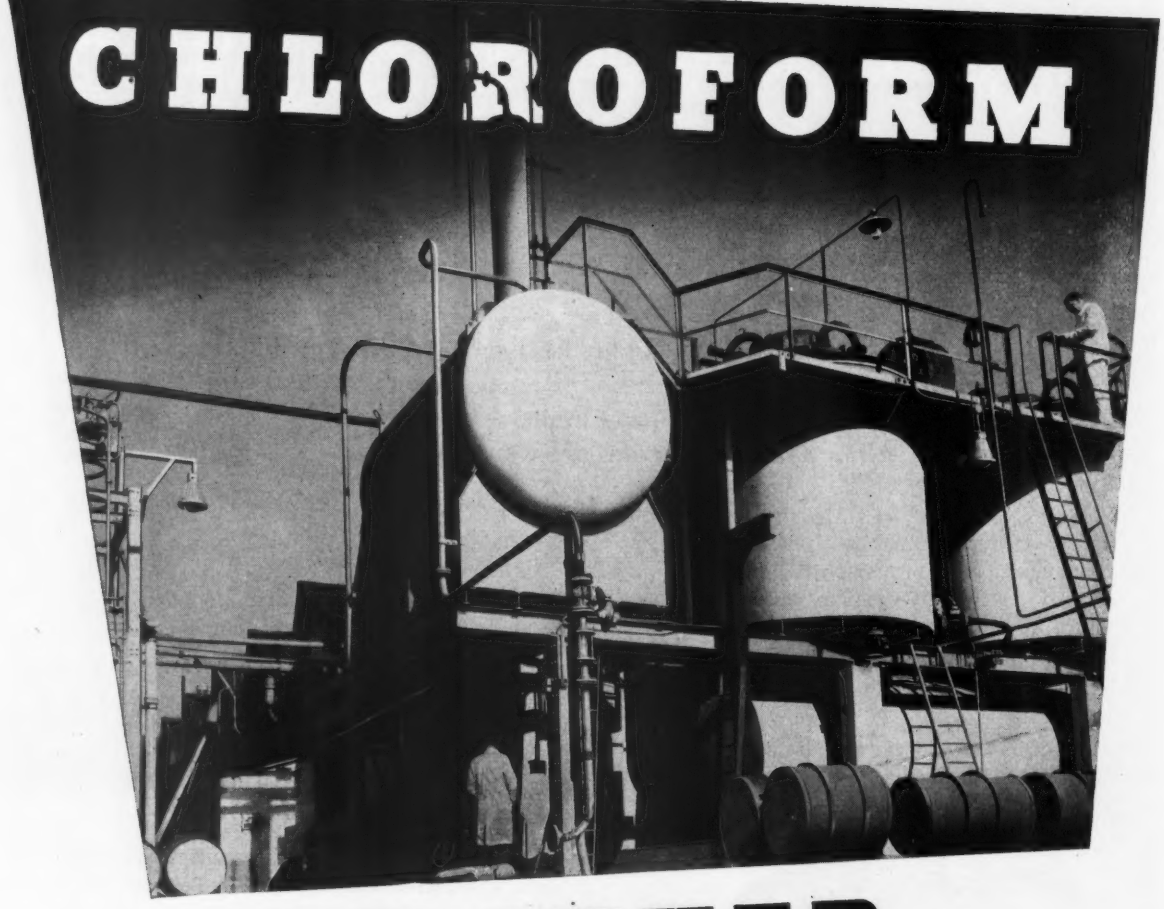
Kingsway House, London, W.C.2. PHONE: CHANCERY 6137

Sole Makers :

E. HUNT & CO. LIMITED

Ripple Road, Barking, Essex. PHONE: RIPPLEWAY 1444

CHLOROFORM



AND ETHER

for the industrial user

The following products are already well-known and established in the many branches of industry where consistently reliable grades of ether and chloroform are required:

ETHER B.P. and B.S.S. 579 · CHLOROFORM B.P.

We can also offer bulk supplies of ether anhydrous (technically pure) and are now producing a technical grade of chloroform with an assay of not less than 99 per cent.

CHLOROFORM TECHNICAL

This product is particularly suitable for applications such as the following: ★ Solvent and reaction medium for chemical syntheses ★ Adhesive in plastic fabrications ★ Solvent for resins, waxes, fats, alkaloids and drugs, fixed and volatile oils, gutta-percha, rubber, camphor, iodine, bromine, and in compositions containing cellulose acetate ★ Dry-cleaning and spotting fluids ★ Insecticide and vermicide. *Your enquiry is invited.*

M&B brand
INDUSTRIAL CHEMICALS

MANUFACTURED BY

MAY & BAKER LTD

DAGENHAM · ENGLAND
ILFord 3060 'Extension 219

ASSOCIATED HOUSES: BOMBAY · LAGOS · MONTREAL · PORT ELIZABETH · SYDNEY · WELLINGTON
Branches and Agents throughout the World

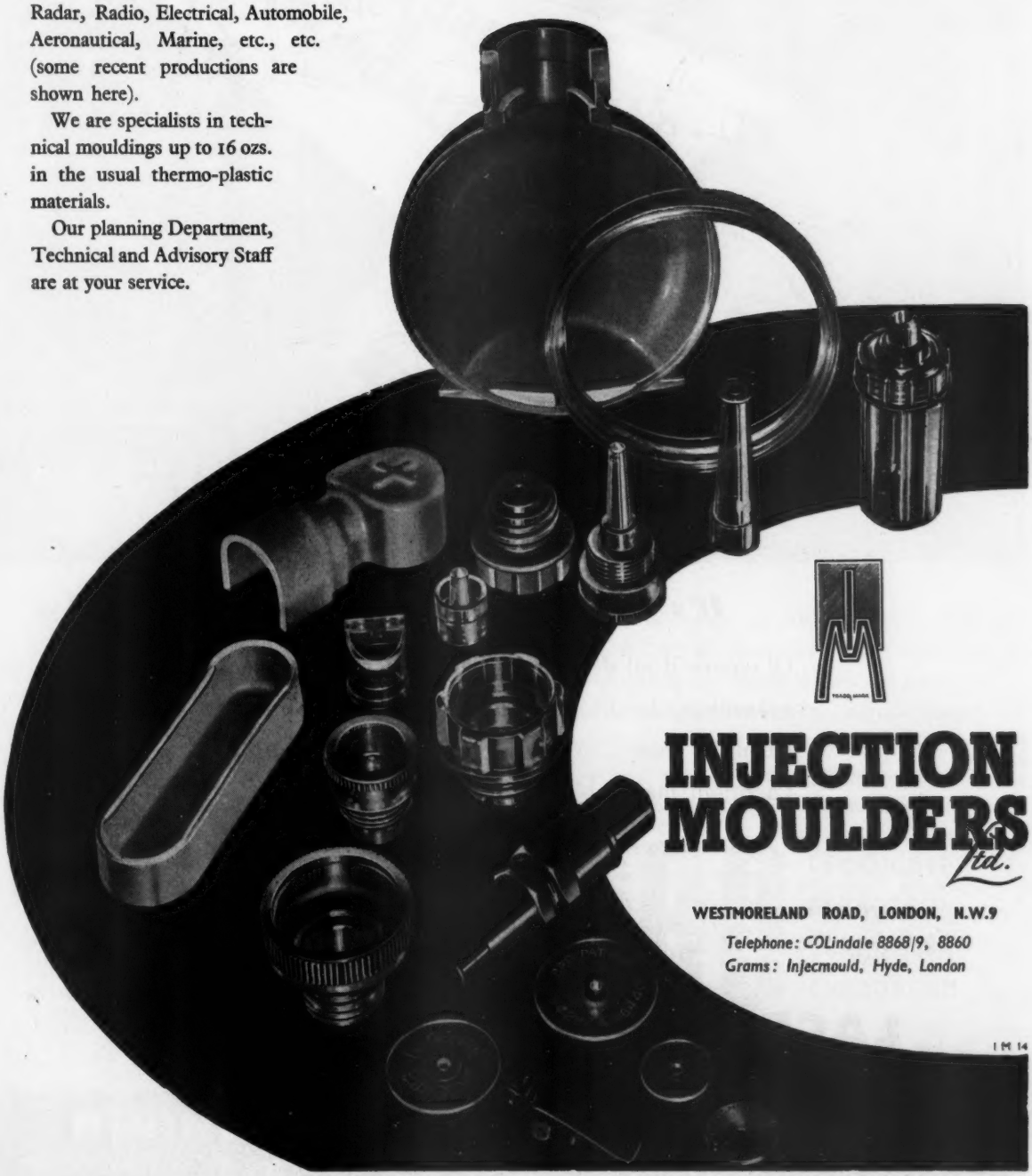
IA404

We are not making bullets . . .

. . . for the Defence Programme. But we are producing injection mouldings for many of the allied industries—Radar, Radio, Electrical, Automobile, Aeronautical, Marine, etc., etc. (some recent productions are shown here).

We are specialists in technical mouldings up to 16 ozs. in the usual thermo-plastic materials.

Our planning Department, Technical and Advisory Staff are at your service.

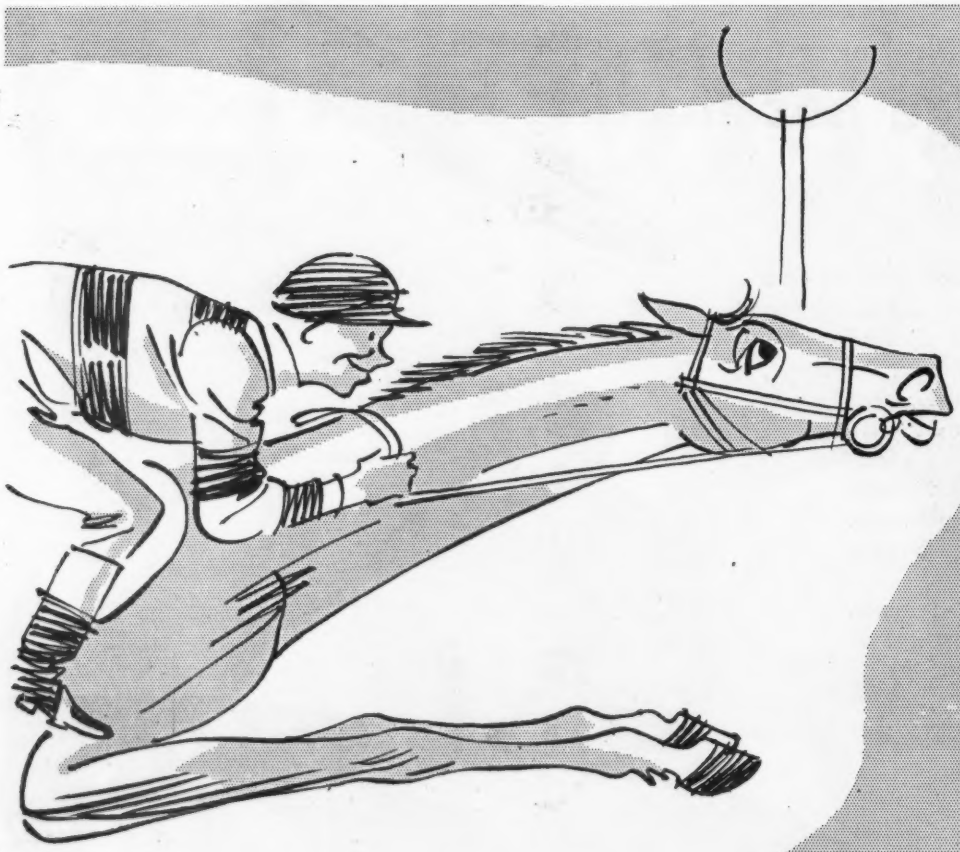


INJECTION MOULDERS *Ltd.*

WESTMORELAND ROAD, LONDON, N.W.9

Telephone: COLindale 8868/9, 8860
Grams: Injecmould, Hyde, London

I M 14



It's the finish that counts

Of course it all depends on what you mean (to quote a Joadism) by finish. But there is no doubt that when it comes to any kind of barrel finishing, Lacrinoid materials win by several lengths.

Readers are invited to send to Lacrinoid Products Ltd., samples of the "work" with which they are concerned. Lacrinoid will investigate the problem by practical tests and will submit a report (without charge) including estimates of the process costs.

LACRINOID BARREL POLISHING **MATERIALS**

"Finer Finishing Faster"

LACRINOID PRODUCTS LTD., GIDEA PARK WORKS, STAFFORD AVE., GIDEA PARK, ESSEX. Tel: Hornchurch 2981

CN 881

MOULD MAKING

made easy for short runs

IN LOW TEMPERATURE THERMOPLASTICS

Spray LOW TEMPERATURE MELTING NON-SHRINKING ALLOYS....

MAKES MOULDS FROM PATTERNS OF ANY MATERIAL

PERFECT REPRODUCTION

LOW PRODUCTION COST

100% METAL SALVAGE

NO POLISHING

HIGH LUSTRE FINISH

NO EXPENSIVE EQUIPMENT

NO HIGHLY SKILLED LABOUR

Cerrobend melting at 158°F, Cerrobase at 255°F and Cerrotru at 281°F are easily sprayed against master models with inexpensive equipment. The resultant negative cavity, reproducing the finest detail, provides excellent mould for short runs in thermoplastics. After use moulds may be re-melted and metal fully recovered.

★ Technical advice in selection and application of correct alloy to suit your problem available on request.

CERRO

CERROCAST
CERROTRU
CERROBASE
CERROBEND

Low-Temperature-Melting Non-Shrinking Alloys ALLOYS

MINING & CHEMICAL PRODUCTS LTD

86 STRAND, W.C.2 Telephone: TEMPLE BAR 6511 (3 lines)

HOT ON THE TRAIL

Are you harbouring scrap P.V.C., Cellulose Acetate, Polyethylene, Polystyrene or "Perspex"? We welcome all clues that lead us to these, or any kind of thermoplastic scrap and surplus material. Let us know the kinds and quantities you have to offer.

PLASTIC SCRAP **BERNARD CHASE**

DUNSTER HOUSE, MARK LANE, LONDON, E.C.3

Telephone: MINcing Lane 8551/6 *'Grams: Mulbright, London*

Agents for: **H. MUEHLSTEIN & CO., INC., 60, East 42nd Street, New York 17, N.Y.**

ATTRACTIVELY MOULDED
For Profitable Sales

Another Example of WWB Precision Moulding

A Complete Service in . . .

Design . . . Toolmaking . . . Engraving

Compression, Transfer & Injection Moulding

Colour Blocking . . . Finishing

Assembly and Packaging

W. W. BALL
& SONS LIMITED

Over **30** *Years' Experience in the Plastics Industry*

BURSTEAD WORKS, KENNEL LANE, BILLERICAY, ESSEX

Phone: **BILLERICAY 411/12** Grams: **PLASTOOL, BILLERICAY**

G.E.C.

Infra-Red Plastic PRE-HEATING OVEN

Free Trial on your own work

without obligation

Replace old methods of pre-heating and get more from your moulding press by using this modern, inexpensive oven specially designed for pre-heating plastic pellets, powder and flake by radiation from thermostatically controlled heating panels.

Write for descriptive leaflet PH.126 or ask for a free trial in your own factory.

- *Thermostatic Control of temperatures between 100-280 C.*
- *Easily accommodated close to press*
- *Operates on 200/250 V 50 cps A.C. Supplies or can be arranged for use on D.C. Supplies*
- *Low power consumption List price £48*

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

To have your cake . . .

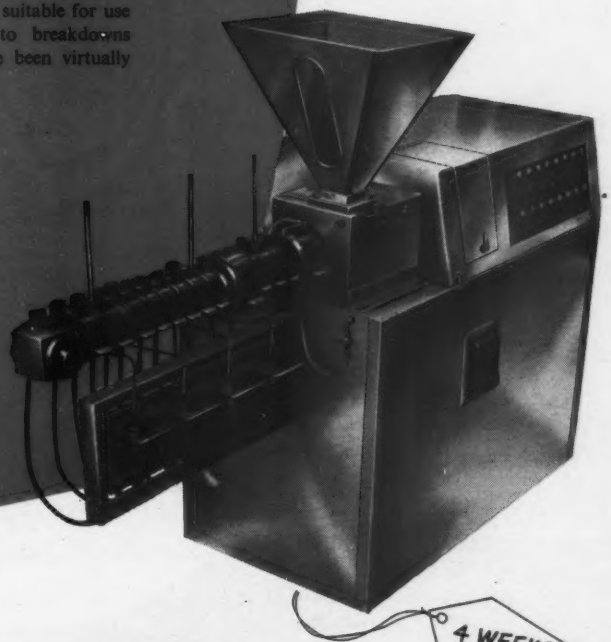
"Oh yes" you'll say. "Just another cliché." But we mean it! Having your cake and eating it—getting the best of both worlds—isn't at all impossible with the Manistruder.

Here is a two inch Extruder handling 100/120 lb. of finished product per hour. (Production Managers, please note!) The Manistruder has no unnecessary gadgets. Every part is easily serviced and maintained, and can be replaced when required as a stock item.

The Manistruder is economical too, in initial cost. (Are you listening, Company Directors?) It is suitable for use by semi-skilled labour, and losses due to breakdowns involving overhaul of intricate parts have been virtually eliminated.

and eat it!

The Manistruder is simple, rugged and reliable—a revolution in precision extruders—with powerful appeal both to the man who produces and the man who pays. Have your cake and eat it? We should say so! Write for fully illustrated folder.



4 WEEKS DELIVERY

MPL

MANIPLASTICS LTD.

HARE STREET · LONDON · S.E.18 · PHONE: WOOLWICH 0885

G

Asbestos-filled Phenolic Moulding Materials

Laminated Sheet Rod and Tube

Shell Moulding and Core Binding Resins

Paper and Fabric Based Laminat

Wood-filled

Cotton and Mineral-filled Phenolic Moulding Materials

Glass Fabric and Asbestos Based Laminates

Urea ulding terials

Alkyd Moulding Materials

Impregnated Papers and Fabrics

Resins for Paints and Varnish

Brake Lining Resins

Phenolic and Urea Adhesives

Densified Wood

High Impact Polystyrene

Post-forming Laminates

Polyester Resins

Here's the material— this is the job

Washing-machine agitators have to be light, strong and resistant to chemicals and hot water. That's why the two shown here were moulded from BAKELITE X13080 Black material. The agitator (top) was moulded by the Witton Moulded Insulation Works of the G.E.C. for the Wilkins and Mitchell 'Servis' washing machine. The bottom agitator, for Thor Appliances Ltd., was moulded by British Moulded Plastics Ltd.

To the established grades of BAKELITE Moulding Powders, Laminated Sheet and Resins, important new materials are being constantly added. There are the alkyds with their exceptional electrical properties; rubber modified phenolics, with their high impact strength; polyester resins for glass fabric laminating, low pressure mouldings, and clear castings. These are just a few. But whatever the application, you'll find a suitable BAKELITE Material to do the job.

TREFOIL

BAKELITE PLASTICS

REGD. TRADE MARKS

BAKELITE LIMITED · 12-18 GROSVENOR GARDENS

LONDON · S.W.1 · TEL: SLOANE 0898

Plastics

DEALING WITH THE MANUFACTURE, USES AND POTENTIALITIES OF PLASTIC MATERIALS

PROPRIETORS: TEMPLE PRESS LIMITED

CHAIRMAN and MANAGING DIRECTOR: ROLAND E. DANGERFIELD

CONTENTS

	Page
Editorials	281
Moulding Powder and Shot	282
Decorated Tableware	283
New Refrigerator Uses Plastics	284
45ft.-Glass-Fibre/Resin Launch Under Test	286
Polythene and P.V.C. for Chemical Plants and Laboratories	288
Plastics in the Service of Man	290
World's Industry Employs Plastics	294
Brass-plating Tank	295
Silicones as Release Agents in the Plastics Industry, by Dr. L. P. Smith	296
Fibres from Plastics	298
Letters to the Editor	301
New Productions	302
Plastics News	304
Talking Shop	308
Educational Facilities for the Plastics Industry, by J. Maitland-Edwards	309
Patent Review	312

EDITOR: M. D. CURWEN, B.Sc., A.R.I.C.
ASSISTANT EDITOR: C. W. WELCH.

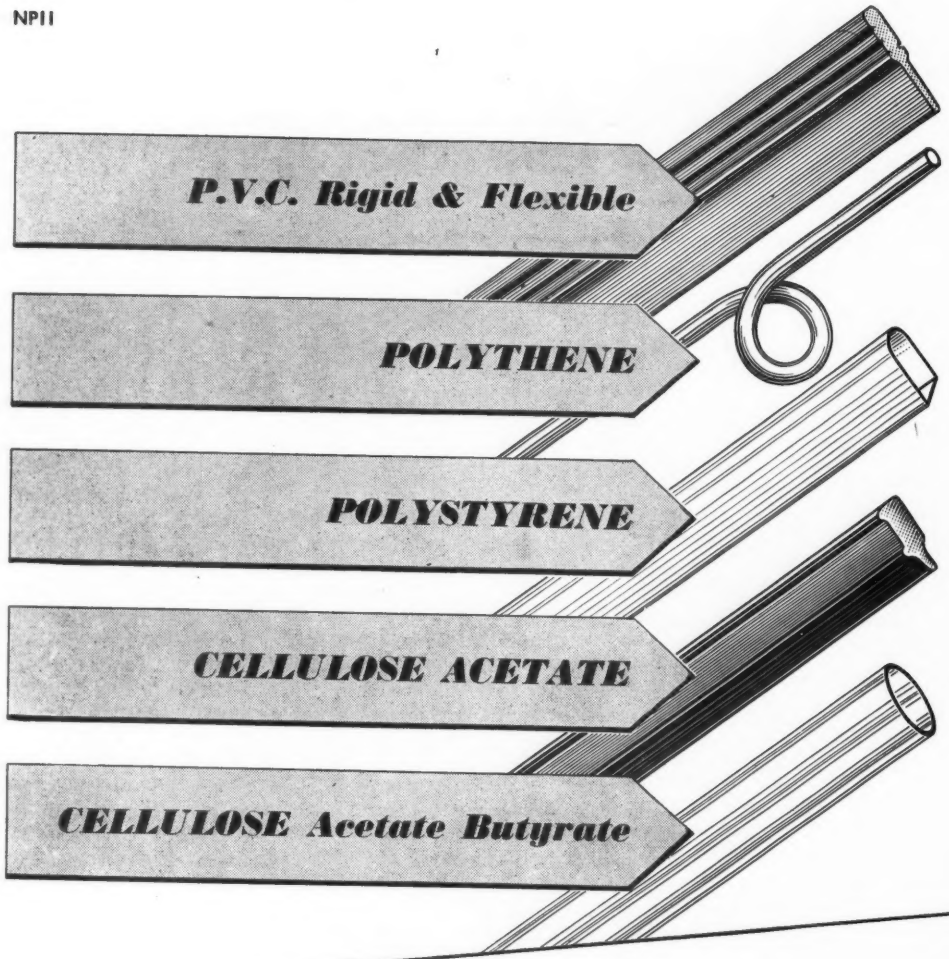
Printed in England and Published monthly by the Proprietors, Temple Press Limited.
Annual Subscription Rate 34/-. Shorter periods pro rata.

Advertisement and Publishing Offices:
Bowling Green Lane, London, E.C.1
Telephone: TERminus 3636.

Editorial Offices:
27, Shaftesbury Avenue, London, W.1.
Telephone: GERrard 4406

A view of the main fabricating shop of Rediweld Ltd., at Crawley, Sussex.

NP11



PLASTICS EXTRUSIONS FOR EVERY INDUSTRIAL PURPOSE . . . IN FIVE DIFFERENT PLASTICS MATERIALS

NATIONAL PLASTICS (SALES) LTD.

Sales organisation for British Moulded Plastics Limited

AVENUE WORKS, WALTHAMSTOW AVENUE, LONDON, E.4. . . . *LARkswood 2323*

Plastics

VOL. XIX. No. 206 SEPTEMBER, 1954

EDITORIALS

Design Group for Plastics

THE problem of the desirability of creating a Design Group within the industry has recently been discussed by an exploratory committee formed by the Plastics Institute and composed mainly of well-known industrial designers already employed by companies in the plastics industry. As a result of this meeting a recommendation has been made to the Council of the Plastics Institute that an advisory committee be set up to implement the policy of fostering good design in plastics. We earnestly hope that such a Design Group will be formed, for our industry is rapidly widening its scope and increasingly is making goods for public consumption, for a public that by and large and because of gradually improved design in many commodities produced by other industries is consciously becoming appreciative of the change.

Clearly, while design in plastics has occasionally been very good, it has also been very bad. Most of it is simply poor and unimaginative. To realize how poor it can be we have only to go back to 1949, when one small new section of our industry so offended even our own uninformed tastes that we were forced to protest in the following words. The subject-matter was on simple fabrication from sheet.

"Before the war the number of transparent plastic sheet manipulating factories could, without great exaggeration, be counted on the fingers of two hands. Some of them were directly or indirectly connected with optical concerns, some made advertising displays, letterings and a variety of objects ranging from transparent food covers to horticultural cloches.

"This section of the industry, born with the coming of celluloid, was still in its infancy, although some fabricators had already begun to do quite useful and important work for aircraft. As soon as war broke out all turned over to the making of aircraft parts, turrets, chutes, ventilators, from cellulose acetate and methyl methacrylate sheet, the latter now far better known by the trade name 'Perspex.'

"The number of companies carrying out this work increased considerably and rapidly during the past six years, for the process needed little plant: a gas or air-heated chamber, compressed-air supply, the means for making wooden formers and drilling, sawing or other simple cutting machines were all that was necessary from the mechanical point of view. The key man was the jig or form maker, and, indeed the skill and ingenuity of the carpenters in such factories was often a thing to marvel at and to be proud of. As for the finished jobs in plastics, experience and M.A.P. and M.O.S. specifications created a skill and accuracy which should prove a good basis for future endeavours. Having said this, however, we must examine the new scene that faces these factories.

"Work for aircraft has almost completely disappeared, many of the factories have turned over to peace-time production and have joined the swarm of 'amateurs' in the game of supplying the enormous demand for articles ranging from cigarette boxes to salad bowls, the only limiting factor being the drop in the amount of sheet now available for fabrication.

"There is a still more unfortunate state of affairs prevailing. Heaven knows we need no high-speed sales agents to sell our goods today, for the country is hungry for anything and will pay almost anything for it. But all this is no excuse for thrusting upon the world such crude things as we have seen in recent days. Some workers are using the very jigs they employed for making aircraft astral domes, turning the result upside down, sticking on three dangerously angular feet as a base with a solvent of deadly secret composition, and lo! they have created a flower bowl. Like stout Cortez, they see new continents before them, ripe for plucking. Or a cigarette box is thrust upon a boxless world with great acclaim, but of a design so poor that the little Cockney boys of fourteen we used to see working in Mr. Woodiwiss's East-end school before the war would turn up their noses in disdain. Indeed, some of the new workers do not realize that the only beauty in these bowls and boxes is the beauty of the 'Perspex' itself.

"We repeat that, technically, the work is often perfection itself. As works of art, the great proportion of the objects made are appalling flops. The fabricators from these plastic sheets have in their hands the making of a new little yet important industry; but if by copying one another's crude designs they conclude that they can in the twinkling of an eye switch over to a development dependent more on artistic design than on technical worth, they are in for a shock. Sooner or later they will encounter competition of such merit (we refer to competition from Europe, especially from France, where aesthetic appreciation is almost inborn and the huge State-fostered industrial art schools feed the new plastics industries) that their own efforts will scarcely reach the markets. The only possible result is complete and undoubtedly deserved failure.

"If, however, British fabricators will awake and realize that it is no use asking the jig-maker for his opinion as to the design of an object destined to dazzle the eyes of the ladies of Buenos Aires or of Calcutta, or, for that matter, of Manchester and London, if he will take an hour off to visit the Victoria and Albert Museum, and if then he has gained an insight of the supreme function of design, he is at least at the beginning of the right road. The trained designer must take charge of design; fortunately, at least some of the fabricators realize it."

The type of fabrication described above has today happily disappeared for, quite apart from bad design, there was also gross misapplication of an excellent plastic material.

Has design improved since 1949? We doubt it if the standard of design bears some relation to the number of designers in the industry; judged by this yardstick the overall picture of applied art or industrial design must be poor. Having said this we must admit one important excuse. By far the greatest number of units or components manufactured by the industry is repetitive, stereotyped and is made to customers' specifications, the moulder having no voice in the matter except when purely technical problems are involved. On the other hand, most moulders encounter entirely new jobs in which they are given some control, and the problem may even be entirely in their hands. Too often, probably as a result of general confinement to stereotyped work, there is no recourse to a

designer; or it may be for reasons of so-called economy or even because of the innate belief, common since the beginning of time when man first scratched on stone or daubed on skins, that we can all do as well as the next man, the next man in this case being the designer. This danger will always be with us while education provides no real appreciation of art or, when it does, segregates such teaching to purely aesthetic levels, away from the needs of everyday life.

It thus remains for the industrial designers to teach the industry, and if only they can instil some appreciation of form and colour they will have done a worthwhile job of work and they themselves will benefit. And it can only be done effectively, we believe, within the industry itself; hence the great need for the Design Group.

"New" Polythenes

THE different polythenes so far generally available in this country have been those which are most suitable for working on the available machines, that is for injection, extrusion, blowing machines, etc. Such types, produced under high pressure, are of average molecular weights varying between 18,000 and 30,000 and possess, in addition to their well-known physical properties, the great toughness and pliability that has been responsible for the world-wide acceptance of so many kinds of consumer goods.

By the same process it is possible to make polythenes of considerably higher molecular weight (about 40,000) which result in greater tensile strength and stiffness, but obviously are generally too difficult to work on existing machines. Equally, low molecular weight polymers of the order of 10,000 to 15,000 have been produced by low-pressure methods. Such resins have lower softening points and although are of lower tensile strengths, nevertheless are clearly valuable in themselves for special applications, e.g., the coating of paper, for polish manufacture and incorporation into textiles, rubber, paints, inks and so on, where water resistant and tack-less films are desirable.

As against the specific production of such low molecular weight polythenes, it is also well known that the normal medium molecular weight resins can be modified by compounding (e.g., the use of polythene-polyisobutylene mixtures has long been specifically developed in this country to a high level of perfection and application), and these mixtures, too, give promise of at least equally great expansion.

MOULDING POWDER AND SHOT

Surgery and Burglary

A recent report in the *British Medical Journal* describes a liquid plastic material which can be sprayed on, or applied with a brush, to dress clean surgical wounds. The new dressing forms a film over the wound and dries in about three minutes. It is easy to apply, is cheap, allows easy wound inspection, and gives increased comfort to the patient. This brings to mind work that was carried out some six years ago in Holland, where experiments were made to apply a plastic film to an operational site before the operation took place. A reasonably wide area was coated with a transparent vinyl-type material, which dried to form a flexible skin. The incision was actually made through this skin and one of the main advantages was that post-operational seepage from the wound did not have the opportunity to attack and break down the tissues around the operational area. In addition, dressing the wound was a much more comfortable procedure from the patient's point of view. A development of this, also in Holland, was the dipping of hands into a polymer solution as a replacement for surgical gloves. Some surgeons found that with the skin of plastic intimately adhering to the hand, a finer sense of touch was possible than with the use of the rubber glove. The coating was peeled off after the operation had been performed. My friend Harry the Lag, who is now in circulation again after a prolonged stay in Devonshire, is both contemptuous and furious at this news—contemptuous because he has been dipping his fingers in polyvinyl acetate for years before going on night shift and furious because he didn't take out a patent on it covering two applications: that of increased sensitivity over woollen gloves while operating delicate mechanisms and that of overcoming certain hazards in his specialized industry.

◆ ◆ ◆

Art and Green Cheese

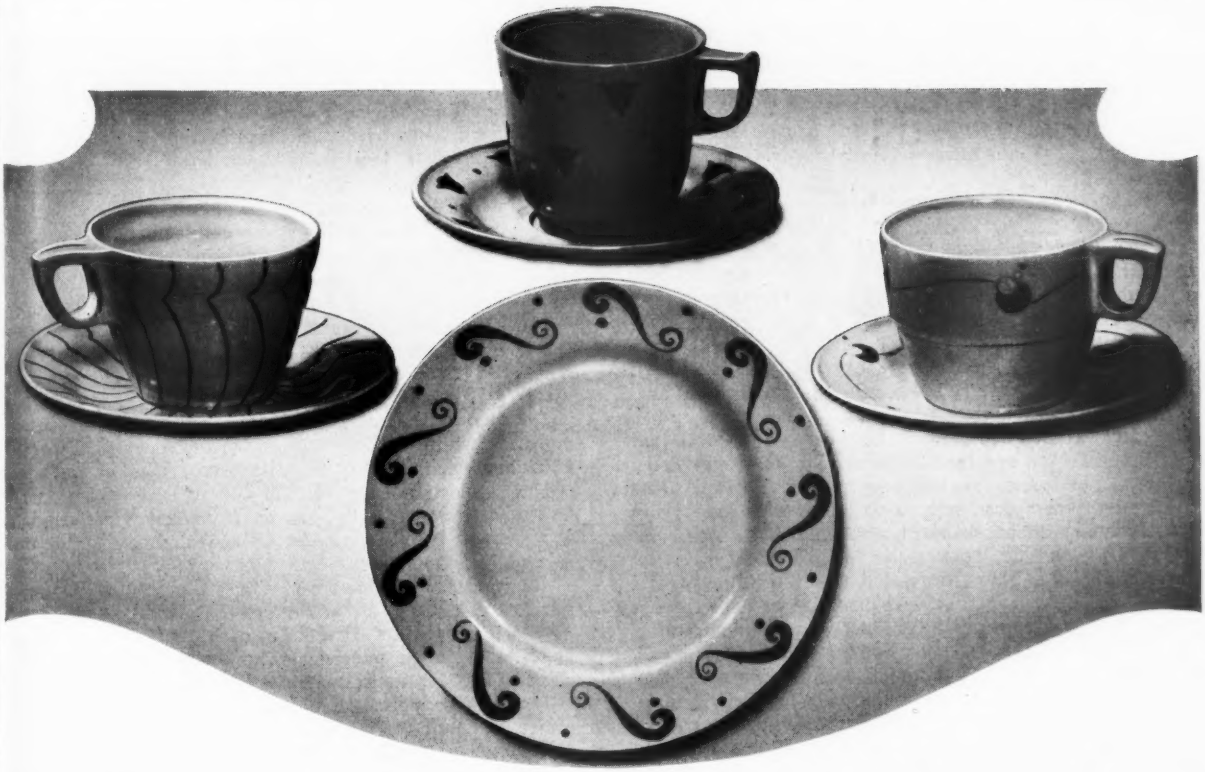
How pleased I am there is to be an attempt to create a Design Group to help improve design in plastics and, we suppose, to teach us something about the proper use of colour, an aspect of applied art in which the industry, generally speaking, is weakest. Among the things I'd like to know is why a mottled effect in plastics seems so cheap and nasty to me. Of course I'm delighted that all artists think as I do, but what worries me is that millions of the public think it's lovely and so do many moulders—some of their recent polythene wash-basins are now of mottled pink and white and green and white. Why do I dislike it? Is it because of an early dislike (fear?) of mottled soap? Yet many of the acknowledged beauties of nature are mottled: minerals, animal skins and flowers; nobody thinks them ugly. And what of my favourite Gorgonzola cheese—does that lose any of its flavour because of its mottle? Can Nature make no artistic bloomers? I remember seeing, long, long ago, in a famous museum in Mexico City, a vast 20-foot door of ancient Aztec craftsmanship, a high wide expanse of alternating waves of dark and pale green malachite, the copper mineral formed eons ago in subterranean fiery cataclysms—a perfect example of mottling admired by millions of visitors, famous artists, great craftsmen and ordinary folk. Was it its history or the colours that gave me such delight? Or was it the 8-in. thick solid real gold frame that surrounded it all and transmitted an ethereal glow to the sombre greens? What couldn't I have done with half-a-ton of pure lovely gold when I was very young?

◆ ◆ ◆

What a Pity!

Is the good old Middle English word "ton" about to disappear from the plastics technical literature? My complaint is directed against both U.S. and Canadian usage of the "pound" when reporting plastics production. Few in the non-English speaking world know what it means, whereas the close relatives of "ton" in the form of "tonne," "tonelada" and so on are almost universal. "Pound" means so little and is little while "ton" is at least derived from "tun," which is a lovely, fat, wooden vessel, full of the best quality beer. Surely the U.S. are not trying to impress the world that it is now producing 3 billion pounds of plastics a year when it is really no more than 1.34 million tons! This business may easily lead to an "international incident" or a big-figure war. Any moment now we may expect an excitable British daily newspaper to give us the splendid news of Britain's overwhelming superiority in plastics production: **G.B., 11.6 billion** grammes; **U.S., 3 billion** pounds; Germany lags far behind with **225 thousand** tons only. (Between you and me, my secret service behind the Iron Curtain informs me that the U.S.S.R. beats us hollow with **56 trillion** milligrammes.)

DOGSBODDY.



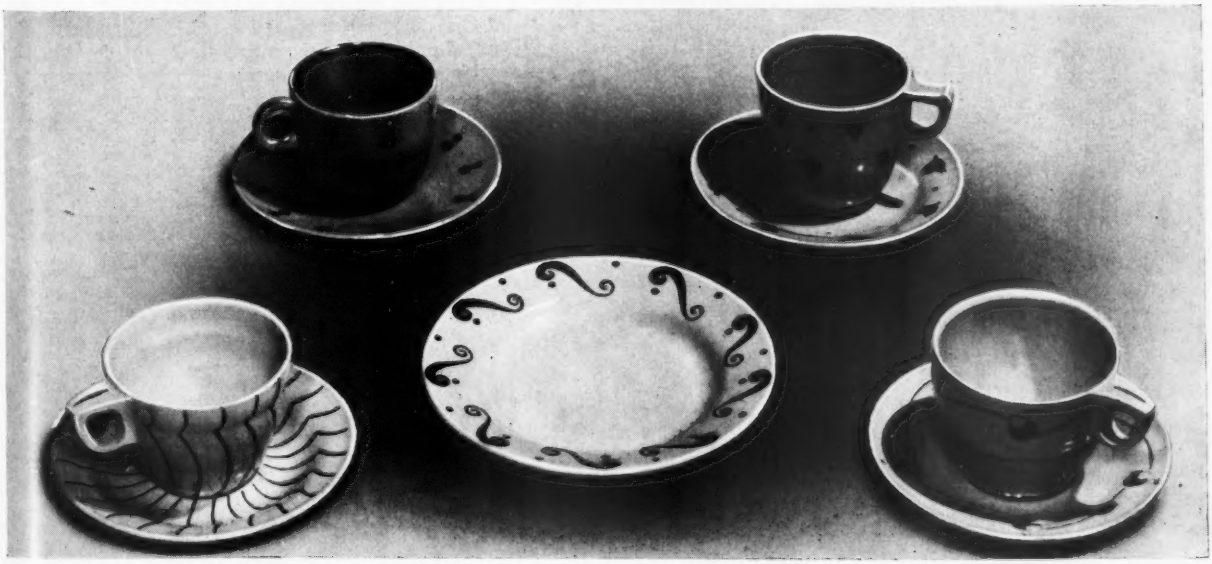
EXPERIMENT ONLY. *The decorations on "melamine" table-ware seen in the photographs are oil paintings and therefore represent nothing more than a hope that one day such embellishments will prove possible. The only practical means today of attaining any type of simple decoration is, as we have already described in these pages, by incorporation of transfers into the moulding, a method of considerable promise and still in its infancy.*

Another possibility, in itself by no means new, is by applied decoration as shown here and its protection by means of a transparent synthetic resin coating followed by a stoving process. Such experiments, on the examples displayed, are in fact now being carried out. We shall report the results whether they show technical worth or failure, since either would give a clue as to further procedure.

Whatever the results we are grateful to the artist, Dorothy Congress who, with a clear insight of modern trends and demands, conceived these delightfully original yet restrained patterns. They were painted by her in oils directly onto the "melamine" ware, in itself no mean accomplishment in view of the glazed surfaces.

We are grateful also to British Industrial Plastics Ltd., who presented us with the table-ware for the experiments.

Colours. Plate: Warm pink "melamine," crimson scroll, leaf-green spots. Cups: (Top left) Deep cream "melamine," burnt umber motif. (Top centre) Eau de nil "melamine," terra-cotta and olive green motif. (Top right) White "melamine," cafe au lait and yellow motif.



New Refrigerator Uses Plastics

We recently visited the works of E. K. Cole, Ltd., where mouldings are now in course of manufacture for the new "Main" refrigerator. Nylon, polystyrene and p.v.c. are amongst the materials which have been selected, and which meet the needs of modern refrigeration technique. A short account of the project follows, with photographs of the various moulded components.

THE common denominator of a large number of domestic kitchens is the gas cooker, and one of the gas stoves most frequently found is the "Main." R. and A. Main, Ltd., was formed in 1887, and had its origins with Thomas Glover who at the Great Exhibition of 1851 showed the first dry gas meter. As pioneers in the gas stove field, R. and A. Main produced the first all-enamelled cooker in 1927 and mass produced the first all-sheet-metal cooker in 1935. Based on these long traditions, it is not surprising that the "Main" gas stove has enjoyed great popularity.

Recently a new subsidiary has been formed, Main Refrigeration, Ltd., and the first refrigerators are now going out to the customers in this country and abroad. This refrigerator is of special interest to the plastics industry in that it contains an unusually high number of plastics components. From the outset, the design staff of Main Refrigeration, Ltd., have co-operated closely with the plastics division of E. K. Cole, Ltd., and thus plastics have made a noteworthy contribution to the production of the refrigerator.

Considerable market research, both at home and overseas, determined that the most popular and conventional sized refrigerator for the normal household is in the 3-cu.-ft. class. This size has been adopted for the first "Main" model. A team of "Main" technicians visited the United States to investigate problems and trends of refrigerator manufacture; special tools, unobtainable in this country, were imported, as a result of which the cabinet follows closely American design trends.

Over 20 mouldings are employed, and with the exception of one phenolic unit, all are thermoplastic injection mouldings; not all are visible in the photograph of the refrigerator opposite. Those which are, are numbered, and thus keyed to the relevant photographs of the moulded parts.

The most interesting technically is the evaporator housing (1), moulded on a split tool, in polystyrene. A 48-oz. Watson-Stillman machine is used to produce this unit. As will be seen from the close-up photograph, the moulding is most complex, involving numerous undercuts. The tool was designed and made by Ekco plastics division and cost £2,000.

Incorporated into the housing is the door (2), and door handle (3), both moulded in polystyrene, and roller for the catch (4), and the hinge pins (5), moulded in nylon. Nylon is specified here to provide the necessary life against continued use.

The thermostat knob (6), moulded in styrene, has recessed numerals which are paint filled. This also is an elegant moulding which enhances the front aspect of the refrigerator.

The moulded housing for the door catch mechanism (7) measures 6 in. by 2½ in. Apart from being screwed into position, four relieved lugs, seen in the illustration, ensure that it stays firmly in place.

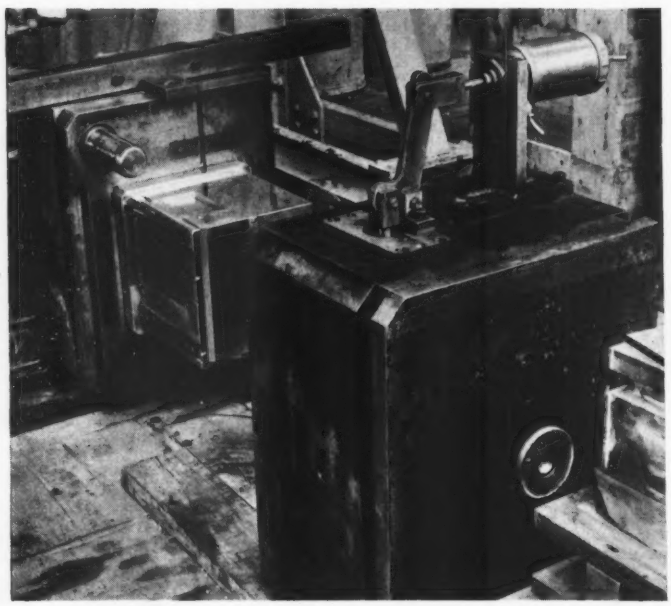
Polystyrene food containers are of course common to most refrigerators. Two, of similar size (8), are provided for the "Main" refrigerator. The lid in each case has a projecting lip, painted on the underside, with the legend "Main" left clear. The base of the container in each case is ribbed.

The shelf supports are of two kinds. Those visible are projecting studs (9). Also used are flanged supports (18), and all are moulded from styrene copolymer material. Four mouldings (10) go to make up the breaker strip assembly. These are also moulded in styrene with lugs and studs moulded *in situ* to ensure rigidity when assembled.

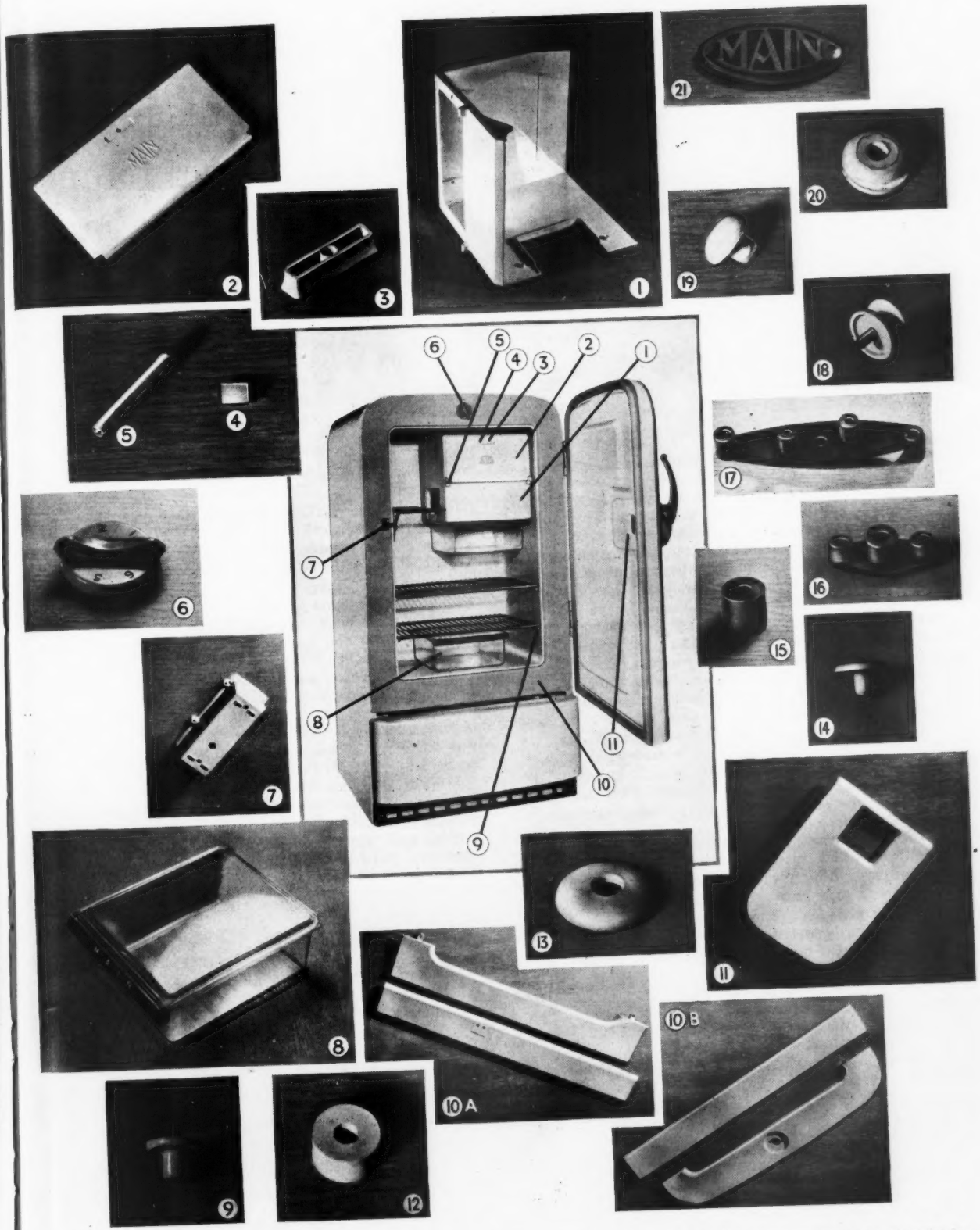
The door mask (11), fulfils a special function, providing the seal between the handle mechanism and the refrigerator interior. The moulding is in styrene and measures 6 in. by 4 in.

A number of components cannot be seen in the main photograph. These are liner packers (12), thermostat knob sealing ring (13), shelf buffers (14), liner spacers (15), all moulded in p.v.c., gusset nuts (16), moulded in nylon, thermostat knob bracket (17), moulded in phenolic material, flanged shelf supports (18) moulded in styrene copolymer, plinth buffers (19) and split grommets (20) in p.v.c. and the monogram on the door (21), an elegant three-dimensional moulding, in acrylic material. The design of the refrigerator has taken full advantage of the special properties of thermoplastics, including strength, maintained at low temperatures, ease of cleaning, absence of rust, which is particularly valuable in the evaporator housing where frosting is inevitable, and attractive appearance. In addition, where the mass production of refrigerators is contemplated, the increased use of moulded components should offer a significant contribution towards reduction in overall cost.

Main Refrigeration, Ltd., and E. K. Cole, Ltd., are to be congratulated both for the design and quality of moulding that has been incorporated in this new refrigerator.



A view of the split tool used to mould the evaporator housing on a 48-oz. Watson-Stillman machine.



THE NEW MAIN REFRIGERATOR: KEY TO MOULDED UNITS ABOVE:—1.—Evaporator housing. 2.—Evaporator door. 3.—Evaporator door handle. 4.—Roller for door catch. 5.—Hinge pin. 6.—Thermostat knob. 7.—Door catch mechanism box. 8.—Food container. 9.—Shelf support. 10A and 10B.—Breaker strips. 11.—Mask covering handle mechanism. 12.—Liner packer. 13.—Knob sealing ring. 14.—Shelf buffers. 15.—Liner spacers. 16.—Gusset nuts. 17.—Thermostat knob bracket. 18.—Flanged shelf supports. 19.—Plinth buffers. 20.—Split grommets. 21.—Monogram.

45-foot Glass-fibre/ Resin Launch Under Test

Some Notes on the new vessel, perhaps the largest in the world so far constructed of plastics.

AS a result of a visit during Cowes week in August we now have the opportunity of supplementing our notes in the August issue on the 26-ft. launch made by Halmatic Ltd. in glass-fibre/resin laminate, with additional information on their new 45-ft. hull. It has been made in the same material to the design of Lieut.-Cdr. Peter Thorneycroft. The hull was finished off as a sea-going launch capable of sleeping six and is powered by two 100-h.p. Gardner Diesel engines. Such hulls can be transformed into open tenders capable of carrying approximately 60 passengers, into pinnaces, police boats, Customs' launches or admirals' barges. From the experience achieved, Halmatic Ltd., now claim that the company is able to make any vessel up to 100 ft. or so in length. Of outstanding interest in the structure of the launch is the fact that the stem is rounded to a radius of 10 in. at deck level which diminishes to a sharp "cutaway" about 6 in. above the datum water line. One of the advantages of the reinforced plastic is that curves present no difficulty whereas curvature in wood introduces high labour costs.

The shell of the craft, including frames and keel, is 0.4 in. thick compared with a thickness of $1\frac{1}{16}$ in. for the wood planking of the launch on which the design was based. The photograph seen below shows the strengthening "ribs" also of glass-fibre/resin construction that have been incorporated throughout the length. It is believed that this new "glass" boat is the largest so far made on either side of the Atlantic.

Now that the main problems of construction have been overcome and success reached in the above size limits it may be useful to re-state some of the more obvious advantages of the new structures. So far as can be judged in the relatively short period since the "glass" boat was first conceived, no claim regarding the value of the glass-fibre laminate from a purely chemical, physical or technical standpoint has been found to be excessive and much information regarding building times and costs has been gathered by the aforesaid company.

Judged from a purely functional point of view and as a commercial non-naval project, the largest and most important market would seem to be in the tropics where heat, humidity, fungoid growth and boring insects have such a detrimental effect on all wooden structures, as we learned so much to our cost during the past war and after, in the New Guinea and Malayan rivers and along tropical shores.

While we have no information that a glass-fibre boat has been tested yet under such onerous conditions, there is such a vast difference between the raw materials used in the two types that certain self-evident advantages appear.

1. Since the glass-fibre and the resin and the composite laminate made therefrom is man-made and man-controlled it is likely that the structures should always prove to be more homogeneous than a structure made from wood, with all the occasional faults of a natural material open during its whole

Interior view showing engine room and part of the glass-fibre/resin hull. Note the special strengthening ribs of cylindrically-wound glass-fibre laminate running at right angles to the main axis of the boat.

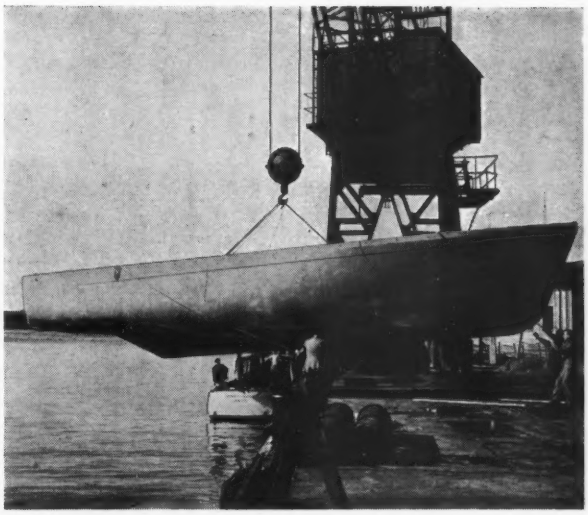
growing life to attack from fungus and insect and malformation.

2. The glass-fibre boat itself is a homogeneous structure and since there are no seams, cannot open when exposed to dry heat as the wooden boat does when "laying up." Leaking, as a consequence, cannot take place.

3. The glass-fibre resin composite is not attacked by bacteria, marine growth or insect borers. Absorption of water is exceptionally low so that "rot" due to the presence of moisture is avoided.

4. The strength of the glass-fibre laminate is greater than that of wood. For data regarding strength tests carried out on sample parts of the boat structure, see *Plastics*, August, 1954.

5. The hulls can be produced in much less time than does an equivalent wooden boat and moreover does not require the high skill of the now fast-diminishing race of boat carpenters. Halmatic Ltd., claim that once a mould is made, a 26-ft. hull can be completed in seven working days and a 45-ft. hull in 15 working days. Once the mould is set up, a close resemblance to line production could be achieved. In terms of labour costs these results speak for themselves and are of overwhelming importance. Actual cost is now claimed to be approximately equal to that of a similar hull made in the traditional manner of wood, furthermore, maintenance costs, ever recurring in the case of wooden vessels, due to starting joints and leaking, must prove exceptionally low. Painting is stated to be unnecessary since pigment can be incorporated in the resin. It is not clear whether this gives the equal of the exquisite finish of a modern paint but it can be presumed that painting as a protection for such structures should be superfluous, while varnishing or painting is essential for the protection of wood boats.



The hull being lowered into the water prior to fitting out. Note the comparative size with that of the workers and the crane.

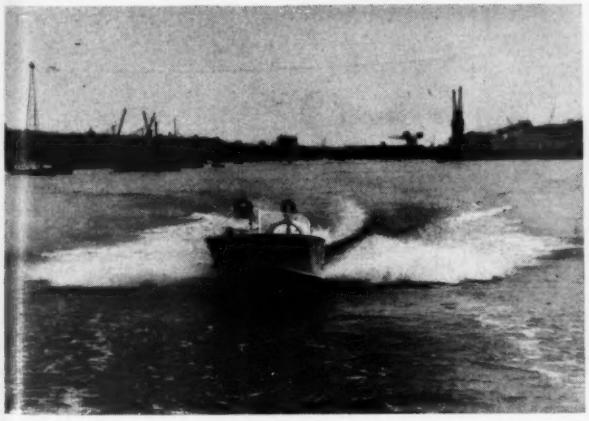
NEW SPEED BOAT

DURING the same period, Cowes Week, we also made a much faster voyage in a speed-boat made by a new company, F. Hutchings and Son. This is the second boat manufactured, the first having been sold immediately after exhaustive tests.

The hull has been made from glass-fibre rovings impregnated with a British Geon polyester and cold-cured with the usual type of catalyst and promoter. The mould was made in two halves securely bolted together and the boat fabricated within it; thus undercuts are possible since the two halves can readily be separated. It is interesting to note that the resin was mixed prior to application with a thixotropic filler so that there was relatively no flow during brushing. By this means the resin content of the glass fibre is practically constant throughout the vertical or near-vertical sections.

The new speed-boat or run-about is known as the "Moonfleet" and is exceptionally manœuvrable at high speeds—during our voyage a speed of 30 m.p.h. was reached in both smooth and very-choppy waters. The boat was obviously exceptionally sturdy and has been deliberately exposed to hard knocks not only in heavy waters but also against piers without any visible damage whatsoever. In any event it is clear now that even severe damage such as penetration on heavy impact, unlike that on wooden boats, is confined to the area of actual impact and that, moreover, such damage is simply and rapidly repairable by relatively unskilled labour. The following data has been supplied by the manufacturer.

Length ... 13 ft. 4 in. Beam ... 5 ft.
Superstructure thickness 1/10 in. Hull thickness $\frac{1}{8}$ to $\frac{3}{8}$ in.
Weight:
Hull and furniture ... ... 250 lb. } 600 lb.
Engine and ancillary gear ... ... 350 lb. }
(The weight of a similar wooden structure is stated to be 800 lb.)
Engine: 10 h.p. (marinized) Ford.
Fittings: Laminated wood, p.v.c. upholstery, Perspex windscreen.



Polythene and P.V.C. for Chemical Plants and Laboratories

With special reference to the work of Rediweld Ltd.

IT is a curious paradox that two of the brightest products of our modern chemical industry, possessing qualities the chemist has long sought, should have met with such a relatively slow reception by the chemists themselves. Although p.v.c. and polythene have been in reasonable supply since the end of the war only comparatively recently have these two materials been used on a wide scale for the fabrication of chemical plant and equipment, and in laboratories. This despite the fact that polythene and p.v.c. are extremely inert substances, admirably suited for the manufacture of pipes, valves, containers and much other equipment that has to come into contact with acids and various other chemicals.

One of the pioneers in this field were Rediweld Ltd., and the company's early work was the subject of frequent mention in *Plastics* (see April issue, 1948, page 169).

Rediweld Limited combined the results of research work carried out originally in the laboratories of the Arc Manufacturing Company with experience gained in other countries to make the fabrication of polythene and rigid p.v.c. a recognized trade; using high frequency welding and gas welding virtually a new branch of technology was brought into existence. Both in Germany and in Great Britain, considerable work was carried out on the strength of welds effected in this way with rigid and flexible p.v.c. and of the nature of the structure of the material at the actual point of joint. Mr. G. Haim joined the parent company of Rediweld, Redifon, Ltd., in 1947 in order to organize a new division for fabricating thermoplastic materials mainly devoted to the production of chemical plant. This new division was shortly afterwards separated from Redifon Ltd., and a subsidiary company, Rediweld Ltd., was formed.

Mr. Haim and Dr. Zade had been working for several years in close co-operation on the welding of thermoplastics. Their article " Recent Progress in the Welding of Thermoplastics," published on pp. 66-71 of the February issue of *Plastics* in 1947 described in considerable detail the developments up to that date covering gas welding, heated tool welding, friction welding, high frequency welding, etc. Included in their article was a valuable list of British, German and U.S. Patents in this particular field.

Recently we re-visited Rediweld Ltd., at their new premises on the Crawley Industrial Estate, Sussex, to acquaint ourselves with more recent developments.

Apart from welding, both polythene and p.v.c. lend themselves to extrusion and injection moulding; all these three processes are used at Crawley in the manufacture of a very wide range of products.

The manufacture of pipes and duct work is one of the

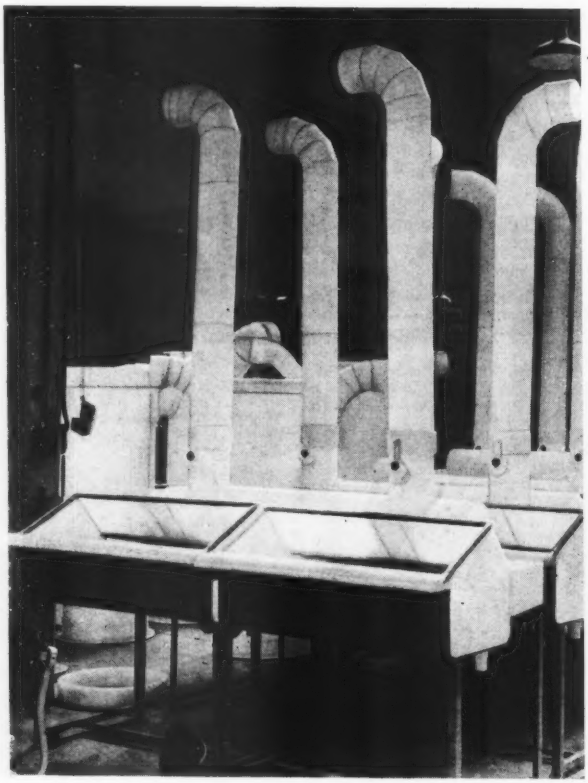


Fig. 1. (Left) Fume ducting. Fig. 2. (Above) Pipe couplings.

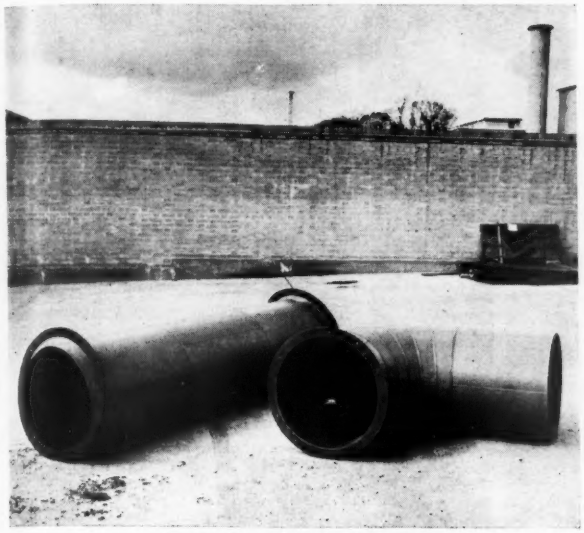


Fig. 3.—Large bore welded tubing.

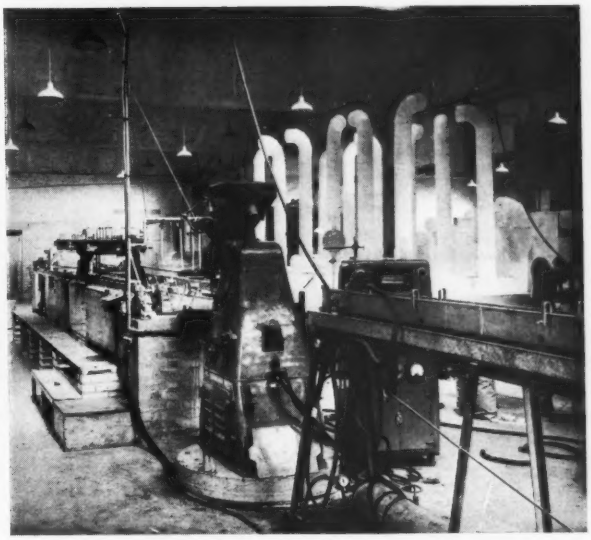


Fig. 4.—Extruder mounted on turntable.

company's principal activities. Pipes up to 8 in. are extruded, larger pipes are fabricated from sheet by welding. As will be seen from Fig. 1, the process lends itself to the construction of sinks and fume hoods and a considerable number of chemical plants throughout the world are now installing equipment of this kind. A typical example of this type of fabrication is also shown in Fig. 2. These units range in diameter from 12 in. to 26 in. and constitute parts of a fume duct assembly. In Fig. 3 is shown a large welded conduit.

Extrusion

The extrusion plant includes a Windsor RC.65 and RC.100; as will be seen from Fig. 4 the RC.65 machine is mounted on a turntable, the control apparatus being housed in a separate unit. The turntable offers a considerable advantage for the type of work carried out by Rediweld Ltd., since both large bore (8 in.) tubing and small-bore tubing can be produced on the same machine using two separate conveyors. The take-off equipment which in the case of the large-bore tubing is rather elaborate is mounted on a brick structure by the side of which is a raised ramp enabling operatives to keep close watch on the production throughout the length of its 50-ft. run. On the opposite side is a lighter take-off unit, constructed from welded angle iron, designed for tubing of 1-in. bore or less.

The use of the turntable affords great flexibility in production and ensures that the extruder is operated on an economical basis. Both flexible and rigid p.v.c. and polythene are extruded.

Laboratory Equipment

Another important development of the company's activities lies in the field of laboratory equipment made from plastic materials. Here p.v.c. and polythene have considerable advantages to offer and the company's production embraces both fabricated units, either turned from stock or produced from extruded tubing, and injection moulded items. Fig. 5 shows a series of graduated measuring cylinders in polythene with dimensions ranging from $\frac{3}{4}$ in. by $5\frac{3}{4}$ in. to 3 in. by 10 in. Fig. 6 shows a range of polythene beakers. On a larger scale, robustly fabricated from polythene sheet, are Winchester carriers for acids and other dangerous liquids, produced to British Standard Specification 830/1939. In Fig. 7 are shown polythene bottle trays.

This range of laboratory equipment, which is constantly growing, constitutes a major development especially for export. Both polythene and p.v.c. are eminently suited to this field of application, providing apparatus which not only possesses excellent resistance to a wide range of chemicals but also reduces breakage.

Laboratories

The move to Crawley has also enabled more space to be devoted to laboratories where routine materials testing is carried out and where the company's fabrications are also first put on trial.

Conclusion

Rediweld Ltd., has made tremendous strides during the comparatively short period of its existence. With the putting into effect of the developments at present under discussion, expansion should be even greater and more rapid and we shall look forward to further interesting developments from Crawley in the field of thermoplastics.

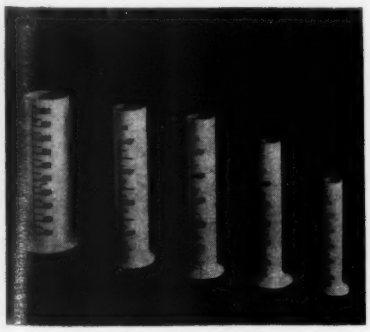


Fig. 5.—Graduated beakers.

Fig. 6.—Lipped beakers.

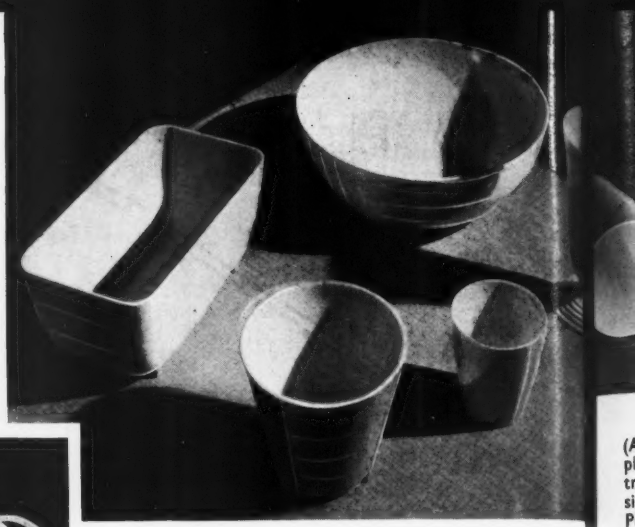
Fig. 7.—Acid bottle stand.

PLASTICS
IN THE SERVICE OF MAN

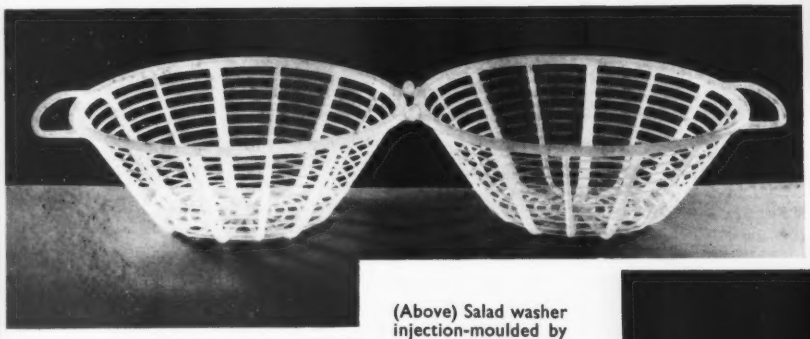
A pictorial review of high-quality units moulded or otherwise fabricated in Great Britain . . .

51. Household Equipment—2

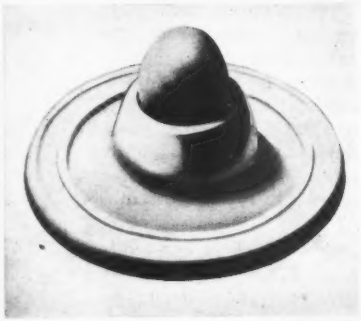
A list of trade marks and companies mentioned in this review, with full names and addresses, appears on page 307.



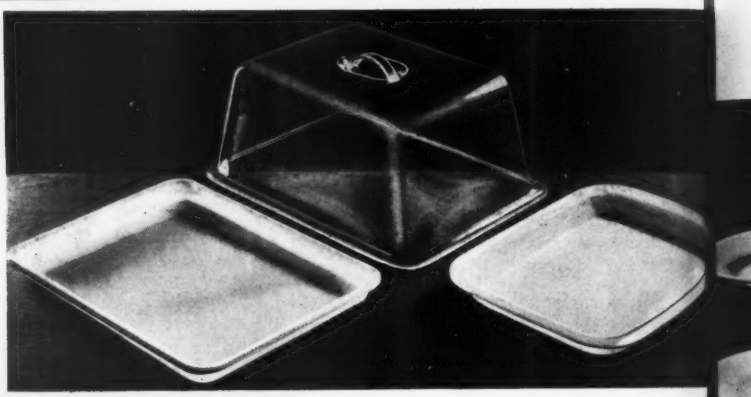
(Above) Selection of domestic articles moulded from Bakelite urea material by Seaforth Engineering Co. Ltd.



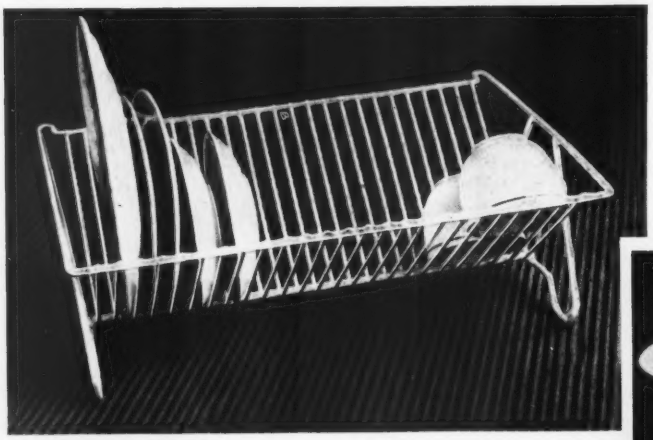
(Above) Salad washer injection-moulded by Craxfords (Ramsgate) Ltd., in polythene.



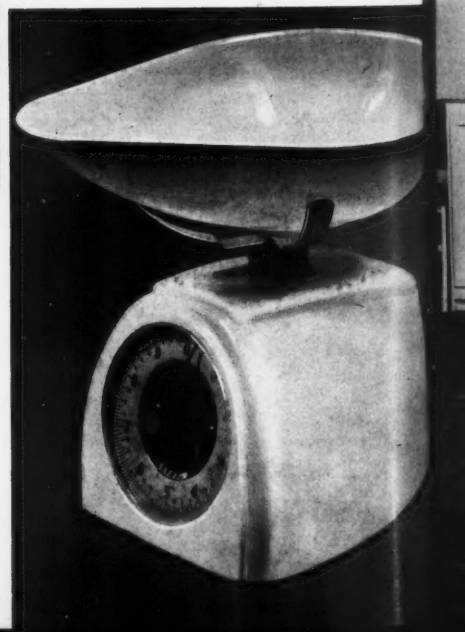
(Above) Eggplate moulded in urea material, by the plastics division of E. K. Cole, Ltd. The unit combines the function of eggcup and plate.



(Above) Food trays and cover moulded in acrylic material by Thermo-Plastics Ltd.



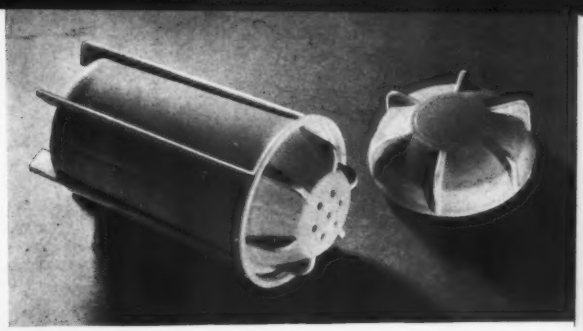
(Above) Wire drainer coated with polythene by Smith Bros. (Wirewares) Ltd.



(Right) Polystyrene scale-case and pan moulded by Streetly Manufacturing Co. Ltd.

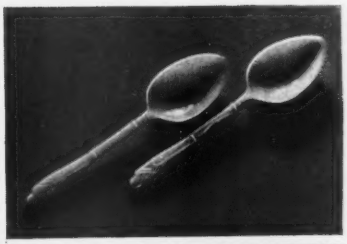
(Below) Crumb brush moulded by Runcolite Ltd., in thermosetting material and designed by Gaby Schreiber.

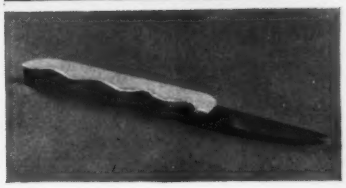
(Below) Apostle spoons moulded in polystyrene by Injection Moulders Ltd.



(Above) Flour dredger moulded in urea by Stone and Simmons Ltd.

(Above) Beakers, plate, and ash-tray, compression moulded by Prestware Ltd. Urea and phenolic moulding powders.



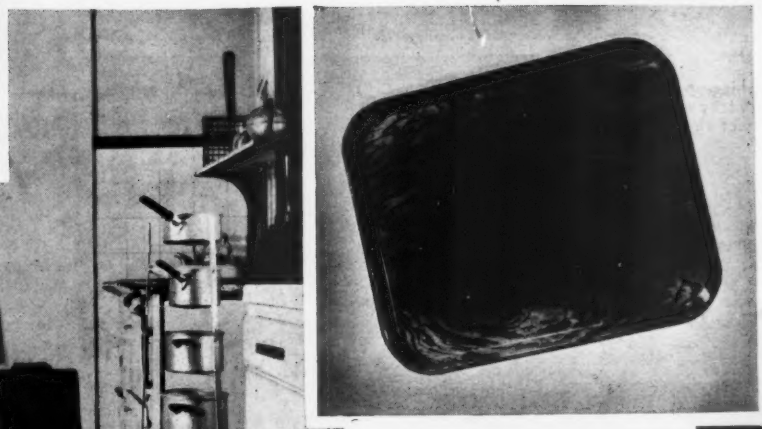


(Above) Kitchen knife. The handle is moulded in urea powder by Norton Plastics Ltd.

(Below) Sandwich box moulded from Beetle urea powder by Brookes and Adams Ltd.

(Above) Condiment set in urea by Norton Plastics Ltd.

(Left) Cake-stand moulded in urea by Norton Plastics Ltd.



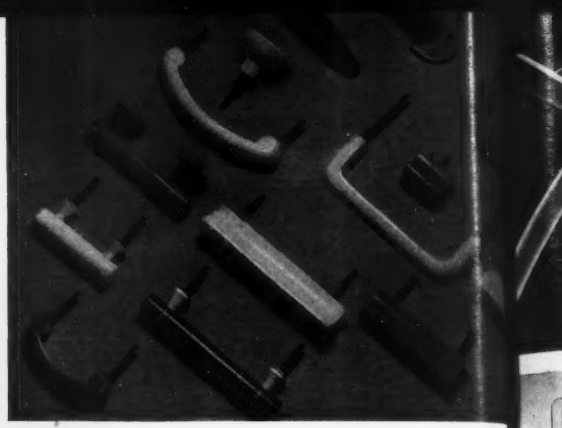
(Left) Paper-based laminated tray moulded by British Moulded Plastics Ltd.

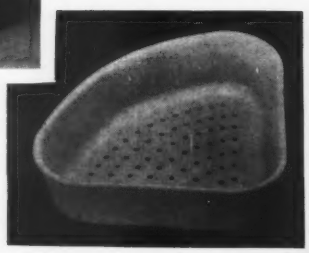
(Right) Soap-dish which clips onto taps, injection moulded by Stone and Simmons Ltd., in polythene.

(Left) Fibrolene plastics floor covering by Terradura Flooring Co. Ltd.

(Right) Handles moulded in thermo-setting materials for domestic applications by Lacrinoid Products Ltd.

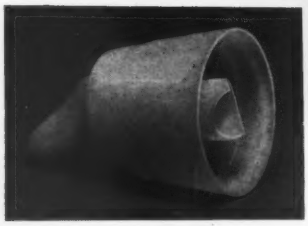
(Below) Sink tidy moulded in polythene by Godfrey Holmes (Plastics) Ltd.





(Above) Milk order disc moulded in urea formaldehyde material by Mendle Brothers Ltd. ("Plastics," October 1954, page 356.)

(Left) Polystyrene tie-rack by Injection Moulders Ltd.



(Left) Milk pourer injection-moulded in polythene by Mendle Bros. Ltd.

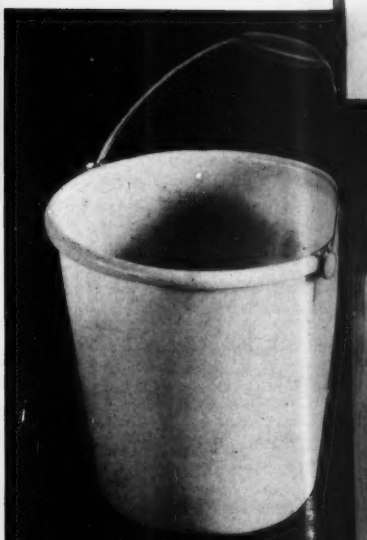
(Above) Polythene colander moulded by Mendle Brothers Ltd. ("Plastics," June 1954, page 198.)

(Above) Polythene washing-up bowl moulded by the Witton Moulded Insulation Works of the G.E.C.

(Right) Injection-moulded food container in polystyrene by G.E.C.

(Above, left) Moulded pourer in polystyrene, by Barclay Stuart (Plastics) Ltd.

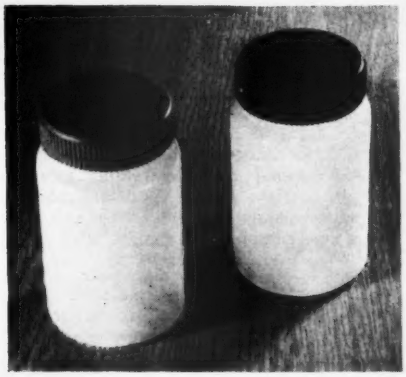
(Left) Kitchen bowl injection-moulded in polythene by Halex Ltd.



(Right) Polythene bucket injection-moulded by Frazer and Glass Ltd.

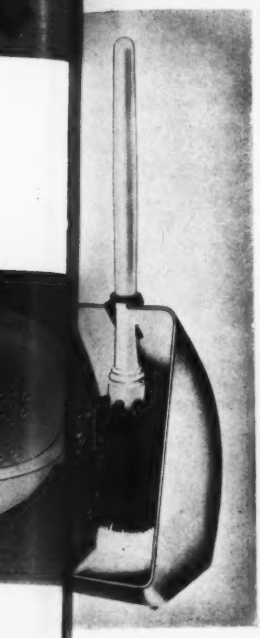
(Left) Injection-moulded knife handles, in acrylic material supplied by Plastics Division, Imperial Chemical Industries Ltd.

(Right) Egg-carrier for picnics, injection-moulded in polystyrene by Stone and Simmons Ltd.

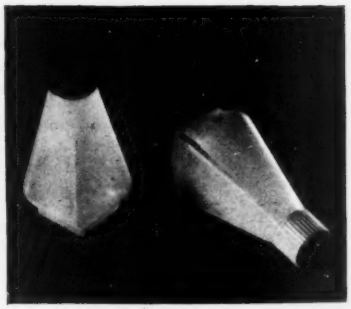


(Left) Sugar and salt sprinklers, in polythene, with injection-moulded caps, by E. Shipton and Co. Ltd.

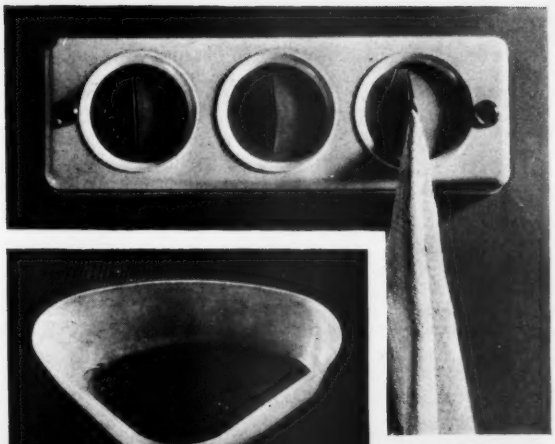
(Below) Celluloid knife-handles by Saunders and Bowers, Ltd., from material supplied by B.X. Plastics Ltd.



(Left) Toilet brush holder, moulded in polythene by Plastics Division, E. K. Cole Ltd.



(Left) Salt and pepper pots fabricated by E. Shipton and Co. Ltd.

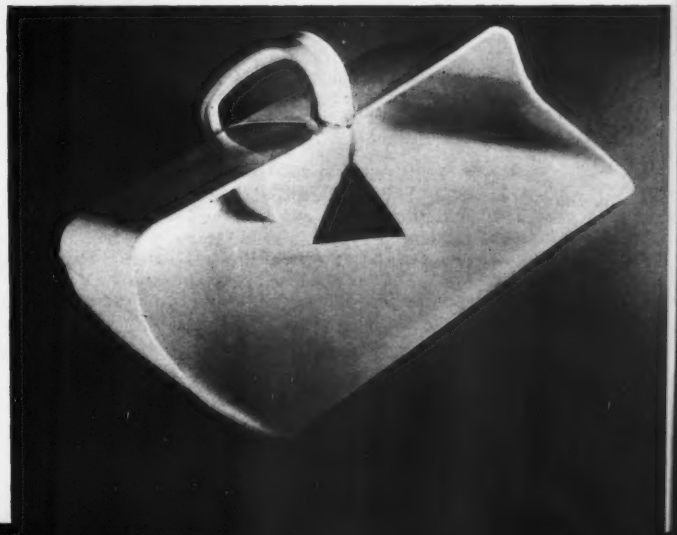


(Below, right) Polythene sink tidy, injection-moulded by Frazer and Glass Ltd.

(Left) Towel holder, moulded in thermosetting material, by W. E. Amies and Co. Ltd. (See *Plastics*, June, 1954, page 199.)

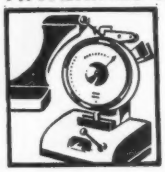
(Below) Kitchen bowl, in polythene, by Frazer and Glass Ltd.

(Below) Dustpan in polythene, by Mendle Brothers Ltd.



World's Industry Employs Plastics

MATERIALS and TESTING



Testing the properties of plastics films.—The National Bureau of Standards has made a general investigation on the physical properties of plastics films. Measurements have been completed on tensile properties, folding endurance, water absorption, water-vapour permeability, low temperature impact strength, change in linear dismensions with time, specific gravity and flammability. Burst strength and resistance to accelerated weathering are still being investigated.
(*Nat. Bur. Standards Technical News Bulletin,* 1954/June/83.)

Silicone rubbers.—M. Wick and W. Dietz give an account of the processing methods and applications of these new materials.
(*Kunststoffe,* 1954/May/200.)

Plastics against cuprous acid solutions.—The newest corrosion resistant material against cuprous acid and alkali solutions used in the wet chemical production of copper are, besides synthetic rubber, various plastics, in particular polyvinyl chloride. These materials are also used for pipelines in the electrolysis of copper.
(*Zeits Metallkunde,* 1954/June/391.)

Continuous production of foils.—K. Stoeckhert compares the working methods of the various types of calenders and continuous extrusion presses at present used for soft polyvinyl chloride.
(*Kunststoffe,* 1954/June/23.)

Nylon bonding cement.—A high strength, non-brittle cement for bonding nylon parts has been developed by Polymer Corp. of Pennsylvania. It does not degrade under prolonged exposure to boiling water or boiling aqueous alkali solutions. This liquid chemical mixture produces practically invisible joints.
(*Materials and Methods,* 1954/June/158.)

Plastics and processing of plastics.—J. Hansen gives a survey of the exhibits of the recent Hanover Industrial Fair.
(*Kunststoffe,* 1954/June/236.)

The migration of plasticizers in polyvinyl chloride.—Well-defined methods permit the exploration of the nature of the migration mechanism which can be considered as an interaction between the material emitting and that accepting the plasticizer. A German draft standard is also presented.
(*Kunststoffe,* 1954/June/250.)

Testing of plastic foils.—A German draft standard is being published explaining purpose and application of the test, definitions (stress, elongation, tensile strength, tear strength, modulus of elasticity, etc). Production of test sample, testing machine. Special suggestions are made with regard to the clamping device. Detailed explanations.
(*Kunststoffe,* 1954/May/214.)

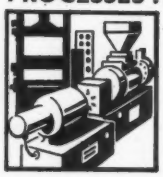
Measuring adhesion strength of plastics films.—Description of a pneumatic dynamometer for measuring the strength of hot-glued foils. Differences of only 1 g can be observed.
(*Kunststoffe,* 1954/May/199.)

Improvements of p.v.c. sheet and leather cloth.—These materials have suffered hitherto from plasticizer diffusion. Hardening of films with simultaneous stickiness of the surface may be due to extracting oils and fats. The article discusses cross-linked surface coating of polyurethane, leading to a considerable improvement in quality.
(*Kunststoffe,* 1954/April/181.)

Curable silicones for the electrical industry.—Of the large variety of compounds curable silicones will provide insulating materials suitable for electric motors and transformers in particular when operating under difficult conditions.
(*Kunststoffe,* 1954/May/191.)

Production techniques for Teflon.—Originally only powder compacting methods were available but now the following processes are applicable: (1) compression moulding (2) hot forging (3) compound extrusion and (4) screw machining of rod or tube.
(*Product Engineering,* 1954/June/183.)

PROCESSES : MACHINERY



New machines for the plastics industry.—K. Stoeckhert gives a survey on plastics and new machines shown at the Hanover Industrial Fair, 1954. It deals with rolling mills, calenders, extruders, injection moulding machines, moulding presses and high frequency heating equipment.
(*VDI-Zeits,* 1954/July 1/591.)

Injection moulding of polystyrene.—H. Mertz deals with the inter-relationship between moulding compound, moulding temperature, moulding pressure and the period of the moulding cycle.
(*Kunststoffe,* 1954/May/204.)

INDUSTRIAL APPLICATIONS

New materials for automotive and aviation industries.—The main materials for fabrics are nylon, followed by Orlon and Dacron for the brighter shades. Foam rubbers will allow new applications, thermo-setting cements are tested for assembly of sheet metal, including door panels and deck lids. Bodysealers of asphalt-elastomer resin will find wider use. Vinyl plastics will be used extensively in passenger cars up to 15 lb. per car.
(*Automotive Industries,* 1954/July 1/49.)

Saran film.—The unusual properties of this material make it ideal for food packaging due to its low gas permeability in film form.
(*Modern Packaging,* 1954/April/117, *McGraw Hill Digest,* 1954/July/20.)

Plastics dies for experimental stampings.—Experimental and prototype stampings for motor vehicles can be produced rapidly at low costs by plastics dies which are light in weight and easy to make. Whilst used for several years in the aircraft industry, the application in the motorcar industry for smaller and larger stampings is relatively new.
(*Machinery* (Lond.), 1954/July 16/121.)

Plastics car bodies at Turin.—Description of plastics motor car bodies exhibited at Turin motor show.
(*Automotive Industries,* 1954/June 1/62.)

Plastics air target.—In the production of recently developed plastics air targets a mould integral with the curing oven is used.
(*Automotive Industries,* 1954/June 1/100.)

Plastics in automotive equipment.—Th. MacNew gives a detailed report of the automotive uses studied at the 6th National Plastics Exhibition at Cleveland. Most of the 175 exhibitors had a product or service applicable for automotive use.
(*Automotive Industries,* 1954/July 1/58.)

Insert bushes for moulded plastics.—An axially slotted inside and outside threaded metal part of brass has proved a useful connecting element between plastics and metals. Applications and future possibilities.
(*Maschinenwelt (Austria),* 1954/7/8/99.)

Plastics for gears.—H. Zickel gives a general survey on the usefulness of various plastics: laminated textile and paper material, vulcanized fibres, textile chips in phenolic binder, polyamides, cast resin and polystyrole.
(*Industrieblatt,* 1954/April/122.)

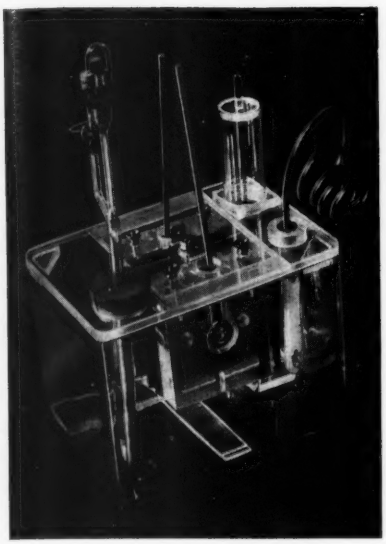
MISCELLANEOUS USES

Teflon impregnated lacing cord.—Hitemp Wires Inc. are marketing lacing cord and tape consisting of high-grade continuous filament Fibreglas impregnated with a uniform film of Teflon, the latter also acting as a lubricant.
(*Wire and Wire Products,* 1954/June/675.)

Teflon hoses.—Resistoflex R-500 is a seamless extruded tube, reinforced with a braided jacket of stainless steel wire, intended mainly for high temperature aircraft and jet engine service. Fluoroflex-T laminated pipe has an internal layer of a new Teflon formulation combined with a high-strength reinforcement of Teflon coated glass fabric.
(*Product Engineering,* 1954/June/183.)

Brass-plating Tank

As part of a joint research programme by the Northern Polytechnic and the National College of Rubber Technology into the bonding of rubber to brass, an experimental plating tank has been constructed. Wide use has been made of "Perspex," as shown by the following photographs.



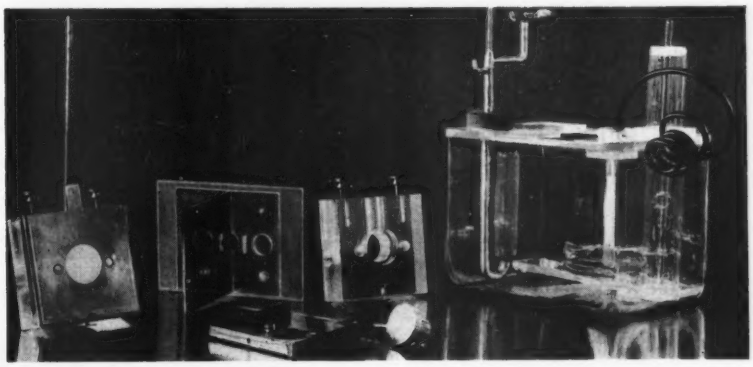
(Above) General view of complete assembly. The bung in the left foreground is a temporary support for the thermostat, which will be permanently fixed to a split Perspex plug, which, after assembly, will be cemented together in position. The two long metal rods shown vertically in the centre are cathode connections and supports.

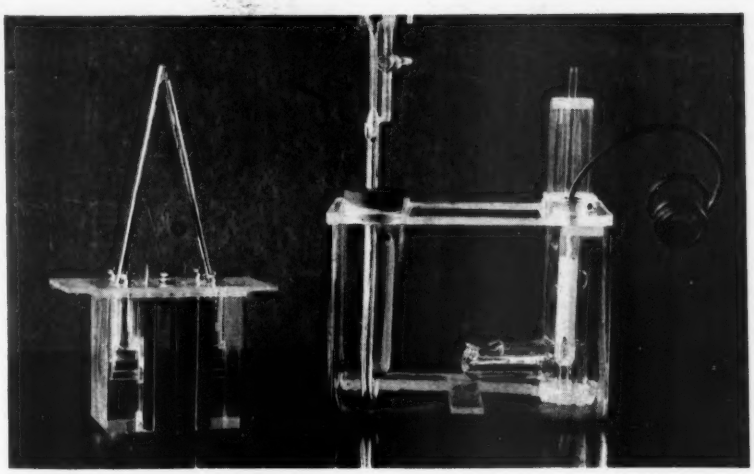
THE photographs on this page, taken at the National College of Rubber Technology, London, show an electrode assembly which has been designed to realize a brass-plating bath (containing mixed copper and zinc cyanides) which is practically air-tight, to minimize carbon dioxide up-take, and which can be well stirred and maintained at constant temperature.

The apparatus is intended for the controlled production of electrode-deposited films of brass on to mild-steel test pieces, of a design recommended by the American Society for Testing Materials as being suitable for the measurement of the strength of rubber-to-brass bonds. This work is part of a programme of research of rubber-to-brass bonding which is being carried out jointly by Dr. Norman Stuart in the chemistry department of the Northern Polytechnic, Holloway Road, London, and the National College of Rubber Technology. All the work on the apparatus, including the machining of the Perspex, has been carried out by Mr. A. J. W. Ring, instructor in rubber technology, National College, to a design which has been evolved by Dr. Stuart in conjunction with Mr. Ring.

The accurate machining of the Perspex block supports for the electrode assemblies enables the surfaces only of the test specimens and the control specimens to be brass-plated, and allows them after plating to be removed quickly without fingering. Similarly, the components can be given a vapour degreasing treatment in trichlorethylene and then assembled in the Perspex supports without being touched. Those parts of the electrodes on which no brass deposit is intended to form have been sealed off with Araldite lacquer No. 650R, which, after baking, provides maximum resistance to attack by the plating solution and the degreasing agents.

(Right) From left to right are shown: the mounted assembly on the Perspex block; next is shown the Perspex lid with the brass anode fixed at right angles to it; below this is the stainless steel plate containing two small detachable test pieces for X-ray and metallurgical examination; next is the mild-steel ASTM cylindrical test pieces in holder; on the right is the plating bath, in glass, inside which is the toluene-filled thermostat, the black flex of an enclosed immersion heater, and the glass rod stirrer, inside a tube, for circulating the electrolyte.



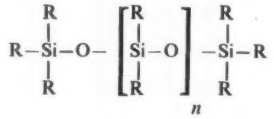


(Left.) On the left-hand side is shown both of the Perspex blocks, with their detachable electrode assemblies, fixed symmetrically on either side of the brass anode to the rebated Perspex lid. The glass tank is of five litres capacity and is shown with immersion heater and stirring mechanism in place.

Silicones as Release Agents in the Plastics Industry

By L. P. SMITH, Ph.D., D.I.C.*

THE basic structure of the silicone fluid polymers that are commercially available at the present time consists of a chain of alternate silicon and oxygen atoms. Alkyl or aryl groups, such as methyl or phenyl may be attached to the silicon atoms, satisfying the valency requirements and producing comparatively inert molecules, which have the general formula,



where n can vary from 0 to over 2,000. This structure imparts a number of remarkable properties to the silicones amongst which are stability to extremes of temperature, low surface tension, resistance to oxidation, incompatibility with organic materials and excellent lubricating properties at high temperatures.

The above properties make the silicones most useful parting agents when processing metals, rubbers and plastics. Their low surface tension makes them effective at very low concentrations because they readily wet and spread over the surface of the mould or die that is being protected. In addition to the economic advantage obtained, the low concentrations required enable closer tolerances to be maintained and reduce the time that has to be wasted in cleaning the processing equipment. The lubricating properties shown by the silicones at high temperatures are also useful because they reduce surface strains and striations, impart a better surface finish and in some cases (e.g., extruder heads) prevent overheating of the machinery.

Four distinct types of the silicones have been found useful as release agents,

(1) fluids, (2) compounds, (3) resins and (4) aqueous emulsions of the above materials.

The exact mechanism effecting release is not yet fully understood and the use of one type rather than another is usually based on empirical tests. There are one or two general rules, however, which will be enumerated later.

Silicone Fluids

Not all silicone fluids are good release agents and it has been found that a di-methyl fluid, that is one in which all the organic radicals shown in the formula above are methyl groups, having a viscosity between 300 and 400 cS. is the most suitable. If alkyl groups larger than methyl, or if aryl groups, are introduced the compatibility of the fluids with organic materials will increase and hence their usefulness as release agents will decrease.

The silicone fluid can be applied neat by brushing or wiping but it is more commonly used as a 0.5-10% solution by weight in methyl ethyl ketone, solvent naphtha, trichlorethylene, white spirit, etc. The diluted solution can readily be applied to moulds, extruder heads, etc., by dipping or with a low-pressure spray gun. The silicone fluids are most useful when processing has to be carried out at room temperatures and when the time cycle is long enough to allow the solvent to evaporate between operations.

* Midland Silicones Ltd.

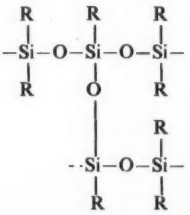
Silicone Compounds

If a semi-solid release agent is required, the incorporation of finely divided silica in a silicone fluid produces a compound which has a consistency similar to that of white petroleum jelly. This consistency, however, is retained by the silicone compound up to 200° C. The silicone compound is most useful when the release agent is required to be applied by hand or brush. It can also, however, be dispersed in methyl ethyl ketone or any of the solvents mentioned above and can then be sprayed or used for dip-coating.

The compound is particularly useful for the pre-treatment of new moulds, or moulds that have recently been cleaned. The compound is applied liberally to the mould or pattern which is then placed in an oven for about two hours at 250° C. The excess release agent is wiped off and the part is ready for use.

Silicone Resins

The silicone resins can be regarded as being made up of structures such as,



and some of them show similar release properties to those possessed by the silicone fluids. The resins are usually available as 50-70% solutions in an aromatic solvent which may be diluted and used in the same manner as described above for the silicone fluids, or which may be used to prepare a semi-permanent release surface. For the latter purpose the resin is applied to the mould, extruder nozzle, etc., by spraying or dipping, the solvent is allowed to evaporate, and the article is baked at about 250° C. for two hours.

Silicone Emulsions

By using suitable emulsifying agents it is possible to prepare aqueous emulsions of the above materials. These emulsions are particularly useful when operating speeds and temperatures are such that rapid evaporation of the water present can take place immediately after application. The use of water, instead of an organic solvent, as a diluent is more economical and also reduces the fire hazard and risk of producing unpleasant or harmful fumes. The emulsions are used at very low concentrations corresponding to approximately ½-2% by weight of the silicone.

The choice of a release agent will depend upon the particular application and the working conditions but the following general rules may be used for guidance:—

1. If the work is of an experimental nature or if the time required for application is not critical the silicone fluid or compound will be of most general use. The silicone compound is also the most useful material for " breaking-in " new moulds.

2. If thermo-plastic materials are to be handled and mould and extruder head temperatures are below 100° C., a solvent solution of the silicone fluid, compound or resin will be the

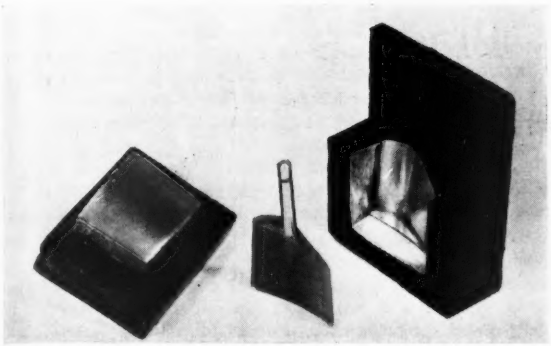


Fig. 1. (Left) Air guide vane made from glass-reinforced polyester resin.

Fig. 2. (Right) One of the main castings for a high voltage oil filtration plant.

most satisfactory. A low pressure spray gun will be the most convenient method of applying the release agent in the factory.

3. If operating temperatures are sufficiently high, one of the emulsions should be used. The time cycle, however, should be adjusted so that the water has evaporated completely before the next operation.

Applications

Silicone release agents are being used extensively in the moulding or extruding of a great variety of plastics. Two cases where they are being used with great success are in the moulding of p.v.c. floor tiles and in the extrusion of polythene tubing. The method of formulation, moulding conditions and the intricacy of the part, however, are all factors that influence the concentration and frequency of application of the release agent and it is not possible to make any inflexible rules. Table 1 has been compiled from actual test cases but should not be considered as a complete record.

Silicone release agents have been found to be effective in the packaging industries, especially in the production of plastic bags from polyethylene or similar films. The adhesion of the thermoplastic materials to the sealing machines can be prevented if the heating bars or wires are lightly treated with a silicone compound. Paper treated with a silicone is also used for packing sticky foodstuffs such as jellies, and chemicals such as glue and bitumen.

In the shell moulding process for casting metals the phenolic resin used in preparing the "shells" sticks to match plates unless some form of release agent is applied. The silicone emulsions have proved to be the most effective agents available. This represents an ideal application for an emulsion because the temperature of the match plates is approximately 250° C. and the time required for the water to "flash off" is very short.

The air guide vane illustrated in Figure 1 is moulded from a polyester resin reinforced with glasscloth. The use of a silicone compound as a release agent enables close tolerances to be maintained and improves the surface of the vane. The mould, in this case, is made from a lead/tin/bismuth alloy, but the compound is equally effective when used with plaster moulds.

(*Continued on page 311*)

TABLE 1

Typical Applications for Silicone Release Agents in the Plastics Industry

Polymer	Method of fabrication	Temperature °F.	Temperature °C.	Recommended release agent	Concentration	Remarks
Acrylic and methacrylates	Extrusion	Up to 180	80	Fluid	Neat	Apply directly to dies.
	Moulding (compression)	300–450	150–230	Fluid emulsion	3–4% in water	Spray as required.
Diallyl phthalates	Moulding (compression)	310–320	155–160	Compound	10% dispersion in solvent	Apply as required.
Cellulose esters and ethers	Extrusion	180–410	80–210	Fluid	Neat	Apply as required.
	Moulding (compression)	260–400	130–200	Fluid	Neat	Apply as required.
Epoxy resins	Casting and moulding	200–400	90–200	Compound	10% dispersion in solvent	If possible, cure for 1 hour at 212°F. Otherwise apply as required.
	Lamination	300	150	Compound	10% dispersion in solvent	Apply every cycle.
Melamines	Lamination	250–300	120–150	Fluid	10% solution in toluene	Apply every cycle.
	Moulding (compression)	270–340	130–170	Fluid emulsion	1–2% in water	Apply as required.
Phenolics	Lamination	250–300	120–150	Fluid	Neat	1 application approximately every 300 cycles when using low pressures.
				Compound	Neat	
	Moulding (compression)	270–360	130–180	Fluid emulsion	3–4% in water	Used when moulding phenolic-cork and phenolic-rubber mixtures.
Polyesters	Lamination	250–300	120–150	Compound	Neat	Apply with clean cloth—sometimes used in conjunction with "Cellophane."
	Moulding (compression)	290–310	140–155	Compound	10% dispersion in solvent	Apply as required.
Polyamides (nylon)	Moulding (compression)	510–530	265–280	Fluid	10% dispersion in solvent	Apply every cycle.
Polyethylenes	Moulding (injection)	300–500	150–260	Fluid	Neat	Apply as required.
	Moulding (compression)			Fluid emulsion	3–4% in water	Apply as required.
				Compound	Neat	Apply as required.
Polystyrenes	Moulding (compression)	265–400	130–205	Fluid	Neat	Apply with cloth or brush.
				Fluid	2–3% solution in solvent	Apply as required.
				Compound	Neat	Apply with cloth or brush.
	Extrusion	390–400	200–205	Compound	Neat	Apply with cloth or brush.
Silicone resins	Lamination	350	180	Compound	Neat	High and low pressures.
	Moulding (compression)	340–430	170–220	Compound	5–10% dispersion in solvent	Apply as required.
Vinyl resins	Embossing	—	—	Fluid emulsion	1–2% in water	Apply every cycle.
	Moulding (compression)	250–350	120–180	Fluid emulsion	0.5–1% in water	Apply as required.
				Compound	Neat	Used when gypsum moulds are used.

Note.—Concentrations refer to the silicone content and are on a volume basis.

Fibres from Plastics

Seventy years ago, within living memory, all fibres were natural fibres. Today, a large number of synthetic fibres is in commercial production. Their development, and their relationship with the plastics industry, is briefly recorded here, with special reference to the polyamide and polyester derivatives.

THE 1880s saw the introduction of a new fibre, man-made in the sense that, although it was derived from a naturally fibrous material, it was by chemical treatment regenerated to yield a fibre possessing special properties. This was viscose rayon, a product of cellulose, of which cotton is largely made up. Whereas natural cotton consists of short, hairy fibres, regenerated it becomes a mass of long, smooth transparent filaments. One advantage resulting from the successful development of this process was that wood pulp, which also contains cellulose, although not to the same extent as cotton, could be used as a raw material, thus eventually freeing the textile industry from complete dependence upon naturally occurring cotton, found in Egypt, the United States, and elsewhere.

The principal pioneers in this field were Courtaulds, Ltd.; other companies became interested, notably British Enka, Harbens, Ltd., and the North British Rayon Company in this country, and du Pont de Nemours and Company, and the Industrial Rayon Corporation, in America.

The advent, however, of a *synthetic* as opposed to a *natural* fibre forming material was delayed until 1938, when nylon was introduced, although artificial fibres of the regenerated type referred to above had their beginnings soon after the work of Parkes and Hyatt in the field of cellulose products.

It is interesting to note the time lag between the introduction of regenerated and chemically modified fibres of the type of viscose rayon, cuprammonium, cellulose acetate, etc., and the truly synthetic fibres, built up from simple chemicals to give complex fibrous materials of the polyamide and polyester types; from the 1880s to the 1930s, a gap of some 50 years.

Research

In his excellent book, "Artificial Fibres," published in 1950 by the National Trade Press, R. W. Moncrieff attributes this delay to the difficulty of analysing fibres generally, coupled with the overall lack of knowledge as to the properties and structures of fibrous materials. "Twenty-five years ago, fibres were thought to be complex and irregular bodies with no simple design; they were not amenable to chemical treatment, and a student could pass through an Honours School of Chemistry without hearing fibres mentioned."

On the principle that before a substance can be synthesized it must be analysed, a completely new field had to be explored, and it was largely due to X-ray diffraction experiments carried out by Laue and W. H. and W. L. Bragg, on simple crystalline bodies that research into fibrous structures was seriously commenced. X-ray diagrams revealed the dimensions of the molecule, and this method of analysis was extended by Professor W. T. Astbury and others to fibres.

An outstanding discovery yielded by this new branch of research was that the molecules which make up wool, cotton and other fibrous materials, were themselves very long and narrow. Just as a long, narrow fibre is required for the manufacture of a good quality yarn, so also is a long, narrow molecule necessary for the structure of a good fibre, and it was W. H. Carothers, working at the laboratories of E. I. du Pont de Nemours and Company, who reasoned that if he took a substance with a reactive group at each end of the molecule, then two molecules could combine together to give a molecule twice as long, which would also be capable of doubling, thus yielding very long molecules. In this he was extending the concepts of Emil Fisher, famous for his synthesis of polypeptides, the lineal ancestors of modern polyamide fibres.

Once these and other basic principles were established, the whole field of synthetic fibre manufacture was opened up, but the extensive research that bridged the 50 years' gap between rayon and nylon should not be forgotten. It embodies the classical research of Carothers and countless other chemists and physicists, and has made possible the synthesis of an ever-growing range of fibres, truly man-made.

The molecular weights of synthetic fibres are high, 12,000 to 20,000 for nylon, 9,500 to 28,000 for "Vinyon." In fact, molecular weight governs first of all the very existence of the fibrous state and additionally, the nature of the fibre produced. Nylon, with a molecular weight below 4,000 exhibits no fibre-forming properties. Between 4,000 and 6,000, weak fibres are formed. Over 10,000, excellent fibres, with high strength, are formed.

It may be said, therefore, that a minimum molecular weight exists for all synthetic fibres. Likewise, a maximum must exist, for very practical reasons; beyond a molecular weight of 30,000, solubility and heat softening becomes steadily more difficult, until a stage is reached where spinning becomes impossible.

Regenerated and Protein Fibres

Before going on to deal with the truly synthetic fibres it is as well to review briefly the development of the regenerated and protein fibres. The first rayons, all experimental, were produced as long ago as 1846. British Patent 283, published in 1855, was taken out by Audemass, but was too early for commercial development. E. J. Hughes in 1857 obtained a mass resembling silk from a mixture of starch tannin, resins and glue.

It was in 1883, however, that Chardonnet took out a patent which covered the first practical rayon manufacturing process, from cellulose nitrate. Viscose rayon followed in 1891. Strongly supported by Courtaulds, Ltd., the process is based upon regenerated cellulose obtained from wood. World production, according to Moncrieff, was 1,000 tons in 1900, and in 1940 was 1,108,000 tons; in 1949 Great Britain alone produced 128,000 tons. Moncrieff points to the vast consumption of timber consequent upon this scale of rayon manufacture and notes that seaweed contains cellulose. Apart, therefore, from the manufacture of alginate fibres from seaweed, here may also be a source of cellulose for rayon manufacture.

Following the development of viscose, was the early work of the Dreyfus brothers who manufactured cellulose acetate as an aircraft dope during the 1914-18 war. Subsequent to the establishment of a factory near Derby, a method was discovered of converting cellulose acetate into artificial silk, "Celanese," made and sold today by British Celanese, Ltd.

A very much smaller quantity of cuprammonium yarn is produced; this depends upon the solubility of cellulose in an aqueous solution of ammonia.

Of the non-cellulose fibres, the most important are those of protein origin. They are principally derived from casein, which has yielded fibres nearest in physical properties to wool, ground nuts yielding "Ardil," soya bean, and the protein zein, yielding "Vicara."

A tremendous field is embraced by these cellulose and protein fibres, and it would be unwise to assume that the newer true synthetics will entirely replace them. In many cases, principally in the protein field, greater development is only limited by the necessity at the moment for conserving the raw materials, due to the general shortage of foodstuffs.

Also the young technologists of today, absorbed by the fascinating study of developments in synthetics, will remember that the pattern of fibre research, responsible for the advances of today, was set in the development of the cellulose and protein materials. Just how much the plastics industry owes the textile industry, and vice versa, it is difficult to say. But at various times the interests of the two fields have come so close together as to be completely fused. This close collaboration may be expected to continue, and since progress in one is more often than not accompanied by progress in the other, the plastics industry has more to gain by this collaboration than might at first appear. And, of course, there is the duality involved in so far as raw material manufacturers are concerned—Imperial Chemical Industries, Ltd., British Celanese, Ltd., Courtaulds, Ltd., to name only a few of the principal concerns.

The New Synthetic Fibres

We come now to the developments, starting in 1938, of the polyamide materials, of which nylon has become the most famous. It was 10 years before this time, in 1928, that Carothers embarked upon his researches into polyamides and polyesters. Nylon as we know it is but one of the series of polyamides. The word nylon itself may be regarded as a generic title for a whole group of materials possessing a similar root. The nylon predominantly used is frequently referred to as "66" nylon because each of the raw materials, adipic acid and hexamethylene diamine, possess six carbon atoms. A similar polymer, also a nylon, is known as "610," derived from sebacic acid and hexamethylene diamine. A third type is made from caprolactam.

Nylon 66 is manufactured by the bringing together of adipic acid and hexamethylene diamine in the presence of a stabilizer, usually acetic acid. During the reaction air must be excluded, either by means of a vacuum or the use of an inert gas, such as nitrogen.

Nylon carpet, after seven years' wear and one submersion in sea-water. Reproduced from the "du Pont Magazine," September, 1954.

The polymer is then melt spun; the resultant filaments are not strong and are dull in appearance. Cold drawing, however, extends the filaments 400% and by this means the molecules are orientated, and as a result the filament is strong and lustrous.

Many of the properties are too well known to require repetition here. Nylon is very elastic, melts at 263° C., is chemically very stable, will not support bacteria or mildew, has a specific gravity of 1.14 (as compared with viscose, 1.52), and has a low moisture absorption.

Again, many applications of nylon are well known, such as nylon stockings, shirts, underwear, yacht sails, bristles for brushes, etc. In all of these applications the special properties of nylon are of prime importance.

Other applications, not so well known, are beginning to make their entry into the world markets. Nylon fur and nylon ropes are but two of the important new applications. In very recent years, nylon carpets have made their appearance, and are now being manufactured by a number of companies in the United States. A trial carpet, put down in a golf club in New York State, in the main entrance, was taken up recently after five years' continuous use. After cleaning, no visible signs of wear could be discerned, despite the fact that adjacent oak flooring and door sills were so damaged by golf spikes that they had to be replaced. It is estimated that nylon carpeting may have wearing properties over 10 times greater than conventional carpeting, of tremendous advantage to business houses and hotels.

It is in order to point out here that the discovery and manufacture of nylon is directly attributable to the textile industry, and that, as a result of this, a new material has come to be made available to the plastics industry. Still largely in its infancy, nylon moulding holds great promise.

"Vinyon"

Almost of equal importance to the discovery of nylon was the production of a fibre called "Vinyon" by the Carbide and Carbon Chemicals Corporation and the American Viscose Corporation, from a copolymer of vinyl chloride and vinyl acetate. It has high wet, as well as high dry, strength but, due to a low melting point and low water absorption, is unsuitable for normal garment manufacture. For special applications, however, it is outstanding; excellent chemical resistance makes it invaluable for use for filter pads and protective clothing for chemical workers.

Several varieties of "Vinyon" are manufactured, notably "Vinyon N," a copolymer of vinyl chloride and vinyl cyanide. "Vinyon N" is used in electrical installations as tapes and braids and for outdoor furnishings.

Saran

The Dow Chemical Corporation introduced in 1940 a new fibre called Saran; derived from vinylidene chloride, it appeared exactly 100 years after the discovery of the raw material in 1840. Saran is now a generic name, as is nylon, and trade names for fibres of this type include "Velon" and "Permalon." Amongst the applications of saran fibres are filter cloths, upholstery and insect screens.

"Orlon"

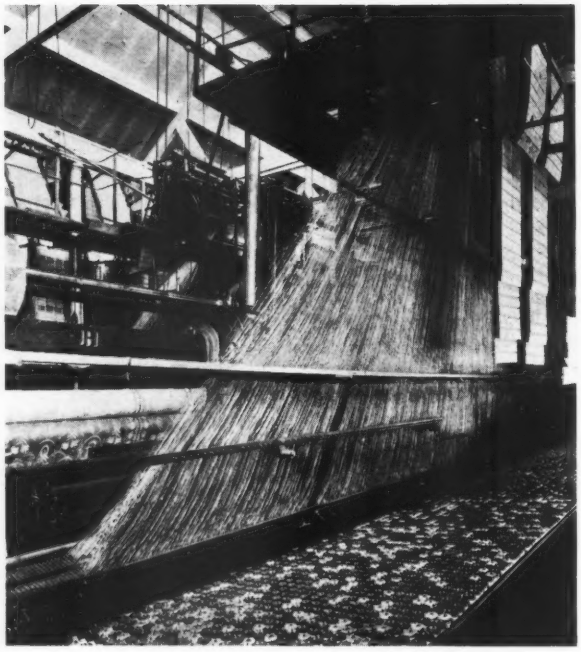
Produced as a polymer from vinyl cyanide, "Orlon" is manufactured by E. I. du Pont de Nemours. Generally its properties are inferior to those of nylon, although perhaps it has superior resistance to sunlight and is claimed to be warm to the touch. Among the uses contemplated for "Orlon" are tents, umbrella coverings and curtains.

Polythene

As described on page 266 of the August issue of *Plastics*, "Courlene" has been launched as the first fibre from polythene. Chemical inertness of the material makes it valuable for protective clothing, and other interesting applications are forecast.

"Terylene" Polyester Fibre

"Terylene" is the brand name for an entirely new synthetic fibre. It is a British invention, having been first made by J. R. Whinfield and J. T. Dickson, in the research laboratories of the Calico Printers' Association at Accrington in 1941.



The strenuous conditions found in the textile industry require a fibre resistant to abrasion and stretch, moisture and mildew, which, in addition, is strong and flexible. These Jacquard strings made from "Terylene" polyester yarn, specially designed for the modern mill, meet these apparently irreconcilable demands.

I.C.I. acquired the exclusive world rights to the patents, except for the United States (where a similar fibre is being developed under the name " Dacron ").

Chemically, " Terylene " is a polyester fibre. The particular polyester from which the fibres are produced is polyethylene terephthalat, a condensation product of terephthalic acid and ethylene glycol. Both these are derived by chemical synthesis from products made by cracking mineral oil.

As " Terylene " was discovered during the war, the Ministry of Supply declared the patents secret and passed the next stage of the work on the invention to the Chemical Research Laboratory of the Department of Scientific and Industrial Research.

Towards the end of 1943, however, the Calico Printers' Association approached I.C.I. and suggested that they should help in developing the new fibre. This was agreed, and the first yarn was made by I.C.I. in January, 1944, from a small amount of polymer obtained from the D.S.I.R.'s Chemical Research Laboratory. This showed promise, and after further small-scale work an agreement was made early in 1947 between the two companies whereby I.C.I. acquired the world rights to manufacture " Terylene " (except in the United States, where these rights were acquired by E. I. du Pont de Nemours and Co.). Experimental plants were built by I.C.I. and were ready both for the production of polymer and for the spinning of filament yarn in the spring of the same year.

These were experimental units only, and plans were already laid for the construction of polymer and yarn pilot plants to produce sufficient quantities of yarn for thorough commercial appraisal. These pilot plants—the polymer plant at Huddersfield, Yorkshire, and the yarn spinning plant at Hillhouse, Fleetwood, Lancashire—were ready by the end of 1949. A year later, sufficient development work had been done to show the exciting possibilities of this new fibre, and in November, 1950, I.C.I. announced that an initial investment of £10,000,000 would be made in a project to build large polymer and spinning plants at Wilton, North Yorkshire, including plant to make the raw material, p-xylene. These plants are due to be ready in 1955 and will have an output of 11 million lb. of fibre per year. I.C.I. has its own oil-cracking plant at Wilton which is already in operation.

There are two distinct types of " Terylene "—filament yarn and staple fibre. They are the same chemically but possess somewhat different physical properties. These differences have been produced intentionally, so as to make the material suitable for widely varying uses. Filament yarn does, therefore, process very much like silk or nylon, whereas staple fibre has a wool-like character and is being processed today on the worsted system. As development progresses, staple fibre for spinning on other systems will be produced. " Terylene " filament yarn and staple fibre are not substitutes for, or diluents of, other fibres. They stand on their own, and offer distinct advantages over other synthetic and natural fibres.

" Terylene " has seven outstanding properties which form a unique combination. It is:—1, warm to the touch; 2, remarkably resistant to stretching and creasing—garments do not lose their shape; 3, quick drying (especially garments made from filament yarn) and seldom requires ironing; 4, unshrinkable; 5, highly resistant to abrasion; 6, mothproof; 7, exceptionally resistant to sunlight, especially behind glass.

" Terylene " combines properties that also make it a very important fibre for many industrial uses.

These include very high strength and tenacity, wet or dry, high resistance to stretching, great resistance to abrasion, outstanding resistance to acids and oxidizing agents, immunity from attack by mildew, moth or bacteria, excellent dielectric properties, and outstanding heat resistance.

The following list will give an idea of some of the industrial applications now being developed for " Terylene ":—For the chemical industry: Filter cloths; acid-resistant braids; safety belts; acid-resistant clothing and anode bags. For electrical insulation: Braided cord or twine, for end windings; tape, for insulation in varnished or unvarnished forms; sheet, for slotting in armatures; lapped conductors, for fine and coarse lapped wires and strip; braided flex, for domestic appliances. For the steel industry: Drop-stamp belting; filtration material for gases. For the sea and ships: Whaling foregoers and tow ropes; deep-sea fish and sporting lines; heaving, lead and log lines; light and heavy netting twines; cod ends and Seines; rigging, lanyards, foot ropes; yacht sails, boat covers. For the textile industry: Jacquard strings; scouring tapes; healds yarns. For proofed fabrics: Tarpaulins; conveyor belting; transmission belting; fire hose; collapsible containers; protective clothing.

Conclusion

This brief survey has, of course, only touched upon some of the major developments which have taken place since the 1880s. Its purpose will have been achieved, however, if it has shown the closeness between the technologies of fibres and plastics. To the textile industry has been given a range of new materials offering fascinating horizons. To the plastics industry has been given the stimulus of fundamental research, and at least two new materials, nylon and glass fibre structures, quite apart from the vast store of knowledge that has been gained in fundamental polymer technology.

In so far as the field for synthetic fibres is concerned, already they constitute some 9% of the man-made fibre field. World production of rayon in 1953 was in the order of 1,840,000 tons. Non-cellulosic fibres, of which nylon constituted the majority, accounted for 175,000 tons. The production of rayon in the United Kingdom was 180,000 tons, non-cellulosics 9,000 tons.

It is evident from these figures that the synthetic fibres have already made great progress since 1938. The limits of their development and expansion cannot be readily assessed. It is a fact, however, that the growth of the oil-cracking industry has opened up a new source of raw materials, and we can, therefore, look forward to still greater expansion in the years to come.

LETTERS TO THE EDITOR

Correspondents are reminded that a stamped and addressed envelope should be enclosed in all cases where a personal answer is desired. It is understood that any letter received may be published at the discretion of the Editor.

Model Engine in Plastics

SIR,—Possibly you may be interested in a toy I recently bought for my son.

As the photo shows, it consists of a small-scale 4-cylinder s.v. car engine in which the main "castings" are reproduced in transparent plastics material so that the internals may be seen working.

As purchased, all the parts are separately mounted in a box; the assembly is done by the purchaser.

The base plate and engine mounting struts are metal; the battery box, which also contains the ignition timing wipe contact gear, is in black plastics material.

The transparent plastics pieces consist of the combined sump and clutch pit; the combined monobloc crankcase and cylinder block and top half of the clutch bell housing; the detachable cylinder head; the valve chest cover; the camshaft timing gear cover. All other parts are metal.

Pistons, con.-rods and crankshaft are assembled in the normal manner (screw-in gudgeon pins and split big-ends). Valves, tappets and springs are pre-fixed in the block but the valves are properly operated by minute cams and the "sparking plugs" (actually miniature bulbs with red celluloid covers over the filaments) light up in the correct firing order (if the assembler has got the timing right) as the starting handle is turned and the pistons reach t.d.c. on the firing strokes. The plastic distributor head is a dummy, for the actual distributor in the battery box is driven at half crankshaft speed from the tailshaft. A small torch battery is used.

The fabric faced clutch withdraws and the gearbox, though possessing no internals, has a spring resistance to obviate inadvertent engagement of reverse gear.

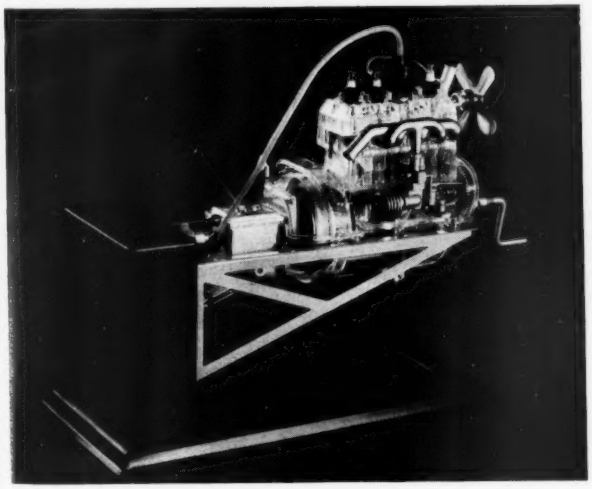
Features include an oil tray in the sump, dipstick, oil filter, oil pump, fuel pump, carburetter with air filter, hot-spot manifolding, starter motor with Bendix-type engagement for flywheel ring, dynamo with swinging adjustment for "V"-section fan belt and the dogged starting handle is detachable.

The dimensions of the assembled engine are approximately 5 in. from starting handle to the tailshaft and 3 in. from the distributor cap to the sump drain plug (actually the earth return terminal from the plug bodies).

The price I paid for the "Gescha" set was £7 7s. and the makers are R. and C. Schmidt and Co., Berlin, Germany, well-known makers of scientific and educational instruments and apparatus.

R. R. HOLLIDAY.

7 Denehurst Gardens,
London, N.W.4.



Scale model, largely fabricated in plastics, of a four-cylinder side-valve car engine. The engine is purchased in parts and is then assembled by the purchaser. The complete unit is made in Germany.

Bathroom Cabinet

SIR,—We have received an inquiry from one of our readers asking for a small bathroom cabinet made of plastic throughout and we wonder whether you know of any firm manufacturing one of these. Our reader particularly stresses that the cabinet should have no metal and no plywood parts.

GOOD HOUSEKEEPING INSTITUTE.

28 Grosvenor Gardens,
London, S.W.1.

Plastics Effigies

SIR,—Can you please advise us of a maker who can produce large numbers of flexible p.v.c. type grotesque animal and human (witch-like) figures with wire reinforcement.

W. PATTISON.

200 Siddals Road,
Derby.

Plastics Cement for Wood and Metals

SIR,—We would be most grateful for names of firms manufacturing plastics cement as we are interested in obtaining a cold setting medium that will withstand temperatures of up to 180° F. and not be affected by slight dampness.

The cement should be suitable for multi-ply beech, or Russian and Swedish Redwood, and also for use in joining woods to aluminium, stainless steel, and commercial hardwood (Masonite, Formica types). It should be odourless and non-toxic after setting.

URWICK, ORR AND PARTNERS, LTD.

21 Mackenzie Street,
Slough, Bucks.

Plastics Flushing Cisterns

SIR,—We are considering the manufacture of plastics (or moulded) W.C. flushing cisterns, as we consider that these will in time replace cast-iron flushing cisterns.

We would be grateful if you could inform us of the method of manufacture, if they are moulded under hydraulic pressure, what is the material used; we think that a moulding similar to a motor-battery casing would be suitable, but with a polished external surface if possible.

THE TOWER FOUNDRY, LTD.

Spurgeon Road,
Belgrave, Leicester.

[EDITOR'S NOTE: Flushing cisterns in non-metallic materials have been produced for some years, more generally in thermoplastic bitumen mixtures. Obviously polythene or p.v.c. could be employed and the cistern moulded by the injection process or by fabrication from sheet followed by welding. These plastics could be welded or otherwise jointed to polythene or p.v.c. piping or to metal by special joints.]

Saucepan Handles

SIR,—We have some saucepan and jug handles made in aluminium alloy which require a heat resisting plastic covering. We would appreciate it very much if you could help us as to the procedure and material required or if there is someone who specializes in this kind of work.

THE SUNDERLAND ALUMINIUM FOUNDRY.

22 Tatham Street,
Sunderland.

Sponges

SIR,—We are interested in the manufacture of cellulose sponges and would be pleased if you could let us have the names of suppliers of the particular cellulose used and the expanding agent.

ROLLRIGHT PLASTICS.

Union Street,
Hereford.

New Productions

Visirecord office equipment uses cellulose acetate butyrate.

Cast resin display unit employing acrylic material.

Plastics in Office Equipment

Visirecord equipment, manufactured by Visirecord Inc., New York, is claimed to increase operating efficiency on production control and office records by as much as 50%. A significant factor with this increase is improved ease of indexing and operating, made possible by the equipment's Visiguide dividers.

The dividers are made of aluminium and topped with a clear, curved strip of Tenite cellulose acetate butyrate. Grooved at the back, the transparent slips hold the index tabs at an angle fully visible from the standing or sitting position. Red butyrate rails, riveted at divider ends, hold the dividers at equally placed intervals, and prevent the slipping out or fraying of records. In this application, the plastics material is subjected to considerable wear, which it withstands exceptionally well.

Pressurized Clothing from Plastics

Plastics clothing which affords complete protection against radioactive dust and particles is now being used at the Atomic Energy Research Establishment at Harwell, and also in the Windscale plutonium factory of the Atomic Energy Authority. The new protective sets were designed and fabricated from p.v.c. sheet by Plysu Products, Ltd., Woburn Sands, Bletchley, Bucks, to ensure strong and airtight seals, all the seams in the clothing being welded electronically.

The clothing is in two parts: the upper half consisting of a jacket with an integral transparent hood and the lower half combining trousers and overboots. The two halves button together at the waist.

A compressed-air-line is fitted to the transparent hood and the constant flow of air maintains an internal pressure of approximately ½ lb./sq. in. throughout the suit.

A similar unit has been developed for chemical plants or for atmospheres carrying harmful dust particles and vapours. This consists of a simple hood, also fabricated from p.v.c. sheet, with H.F. welded seams, which has a transparent visor and a generous "skirt" which is tucked into the neck of normal protective clothing so that it covers the shoulders. Compressed air is fed into the hood through an airline to maintain comfortable conditions for the wearer. Misting is also prevented.

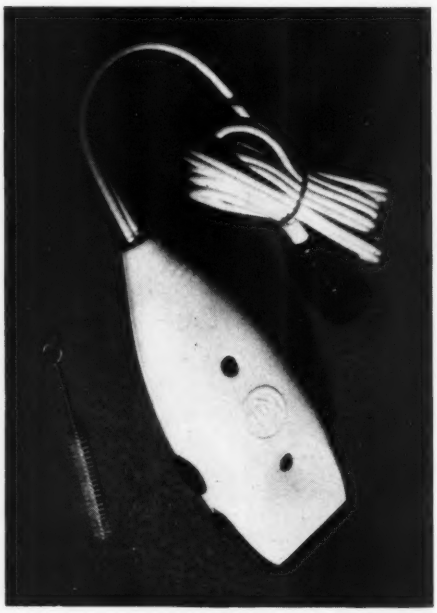
Cast Display Unit

Anglers the world over will be familiar with Hardy flies. Fifty-three different varieties and sizes of these delicate lures have been embedded in acrylic material to form a panel 12 in. by 9 in. by 1 in. thick. The intricate task of casting a complete unit of this nature has been carried out by Peter Stanley, of Hambrook Grange, near Chichester, Sussex. Mr. Stanley is a specialist in acrylic embedding and casting.

The result of his labours in this particular case has been the production of a most intricate display unit.

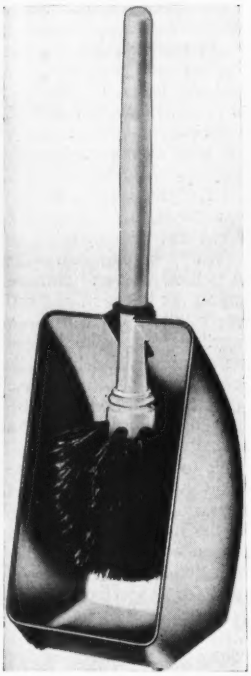
Moulded Electric Razor Body

Injection Moulders, Ltd., of The Hyde, Hendon, London, N.W., have moulded the electric razor case illustrated in Erinoid medium-high impact, heat-resistant grade polystyrene. As will be seen from our illustration, a high level of industrial design has been achieved in the manufacture of the razor housing. The use of the higher impact strength material, combined with its heat resistance, makes it an ideal material for this product.



(Left) Protective clothing for atomic workers fabricated from p.v.c.

(Right) Electric razor body moulded in polystyrene.



(Left) New toilet brush holder in polythene by by E. K. Cole Ltd.

(Right) New production of the Parker Pen Co. A ball-point pen moulded in nylon.

New Toilet Brush Holder

E. K. Cole, Ltd., have now put on the market a toilet brush holder which is claimed to be ideal for use in the home, offices, municipal buildings and institutions. The unit is moulded in polythene, ensuring that it will not crack, rust or stain. With this ingeniously designed holder, the brush is concealed from view, being suspended from a vent at the top of the holder with the aid of a rubber ring which will fit practically any type of toilet brush. The unit is available in mottled blue, green, and pink, and in ivory.

Plastics Switch Mechanism

Underground railways throughout the world make use of a special switch mechanism which controls the hydraulic opening and closing of carriage doors. Such switches are subjected to severe and continued use and two of the most important components are moulded in this country by Rootes Mouldings, Ltd., of Slough, Bucks. Our photograph shows the complete assembly, beside which are seen the two plastics components, moulded from high-grade phenolic material. The actual contact mechanism consists of the moulded plate into which is incorporated a brass flat.

Because of the continuous wear and tear to which these mechanisms have to submit, tolerances are of a very high order. The mouldings themselves, therefore, represent a significant achievement in satisfying a highly critical demand.

Nylon Pen

The *du Pont Magazine* for July, 1954, records the use by the Parker Pen Company of du Pont nylon for the moulding of the Parker Pen Company's first ball-point pen. Sold as the "Jotter," the pen itself is claimed to give 600% more writing than the normal ball-point pen. A new type of ink chamber is used which permits all the ink to be drawn out.

Horticultural Research in Plastics

The advent of polythene into the field of agriculture and horticulture was originally recorded in the pages of *Plastics*, and has been the subject of frequent comment. Our illustration shows how components for trickle irrigation equipment can be made up from polythene by cutting and welding. The material is also very simple to machine and can be easily threaded. Much development work is now taking place at the National Institute of Agricultural Engineering, where the photograph was taken.

New Moulded Radio Cabinet

Featured at the Radio Show this year was the Ekco "New Radiotime." By means of a Smiths clock inset in the grille, the radio can be automatically turned off and on. For the benefit of especially heavy sleepers, an alarm buzzer is also fitted. It is designed to go off ten minutes after the radio itself has been switched on.

Polythene in horticulture.

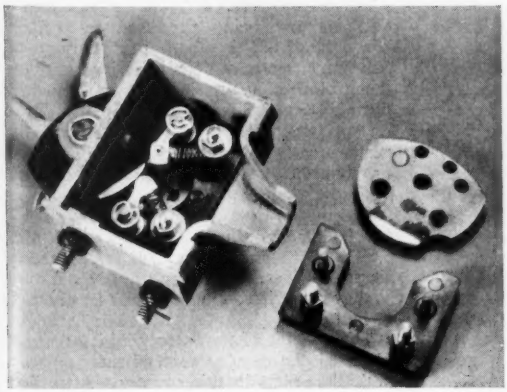
The case is moulded in phenolic material with very attractive lines, and the grille is moulded in polystyrene. All the mouldings were carried out by the Plastics Division of E. K. Cole, Ltd.

New moulded radio cabinet.

Plastic Piping in Cars

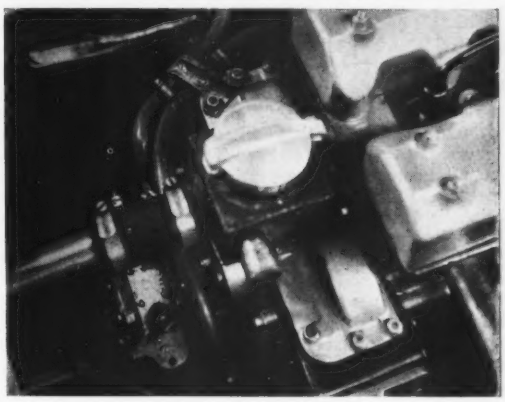
The Connaught racing car has received considerable publicity in the press recently and is hailed as a potential competitor to the record-breaking Ferrari and Mercedes-Benz cars. An interesting innovation by the manufacturers, Connaught Engineering, has been the incorporation of transparent p.v.c. fuel lines. Our photograph shows two of these fuel lines running from top to bottom of the picture. This 2½-litre racing car is fitted with four carburetters.

One of the benefits resulting from the use of this transparent piping is that fuel blockages can be quickly spotted and rectified.



(Left) Moulded components used in switch mechanism.

(Right) Plastics piping in use in racing car.

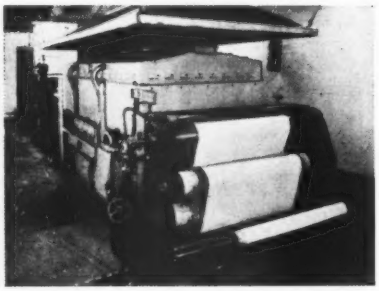


Plastics NEWS

Raw Materials, New Plant, Works Organization, Control Apparatus, Research, Personal and Trade Notes

GELLING P.V.C. BY RADIANT HEATING.—P.v.c. coated fabric oilskins are gaining great popularity with seafaring people by virtue of their toughness and absence of sticking. The plastics coating is obtained by spreading on the fabric p.v.c. paste which is then gelled by the application of heat. The heating plant must be so designed as to ensure uniform gelling over the whole width of the fabric, and discolouration must be avoided due to local overheating.

The Great Grimsby Coal, Salt and Tanning Co., Ltd., who are amongst the manufacturers of fishermen's garments, use for the heat treatment process an electric radiant



Radiant heating plant designed and manufactured by G.E.C. Ltd.

heating plant, which has been designed and manufactured by the General Electric Co., Ltd. The fabric with its coating of p.v.c. passes continuously from the spreader through the plant where it is heated by radiation, from shielded wire elements mounted in reflectors of special aluminium alloy. The paste is cooled in 30 seconds and some 360 yards of material, in width up to 40 in., can be produced per hour, although the plant is only 3 yards long. The plant is enclosed as far as possible with highly efficient reflecting surfaces of aluminium alloy. Its length is divided into three separately controlled sections, each of which can be switched to full or half heating intensity. Flexibility of this arrangement allows variations to be made in the heat curve to ensure that the coated fabric is completely cooled as it leaves the plant.

PRE - HEATING OVENS.—Recently introduced by Stewart Gill and Co., Ltd., 157 Fairfax Road, Teddington, Middlesex, the Rapiradia pre-heating oven can now be delivered. Advantages claimed for the oven include economy of pre-heating moulding powders, and economy in space. Overall height is 4 ft. 4 in., width 1 ft. 6 in.

Employing gas heating, the unit has good production capacity. Used in the production of electrical 5-amp. plug bases, the output was 473 pieces per hour, the gas consumption being equivalent to .46d. The rate of heating up the oven from cold to 240° F. is 150 minutes. Full details are obtainable from Stewart Gill and Co., Ltd.

NEW POLYTHENE CUTTER AND SEALER.—The Audion portable tool, manufactured by the Martin Agency, 43 London Road, Kingston-on-Thames, has been designed for the cutting and sealing of polythene and other similar materials in one simple operation. The work is performed by the metal tip of the tool being drawn along a straight edge or round a template of any irregular shape. Electrically operated, the tool is useful for short runs.

EUROPEAN MACHINE TOOL EXHIBITION.—As previously recorded, Wickman Ltd., of Coventry, England, will be exhibiting at the Fourth European Machine Tool Exhibition at Milan which takes place from September 14-23. Amongst the machines on display will be horizontal boring and milling machines, single spindle circular automatic table milling machines, universal grinders, and internal grinding machines.

NEW MULTI-PURPOSE TOOL.—Marketed by Brooks and Walker, Ltd., 47 Great Eastern Street, London, E.C.2, the Diprofil machine is designed to facilitate manufacture of tools, dies, moulds and all classes of toolroom and precision engineering work. Amongst the functions carried out by this machine are filing, lapping, scraping, grinding, honing, engraving, milling and sawing.

NEW POLYSTYRENE COMPANY.—The Distillers Co., Ltd., announce that negotiations have recently been concluded with The Dow Chemical Company of Michigan, U.S.A., to form a British company with the name Distrene, Ltd. The objects of the new company, in which Distillers will hold the controlling interest, are to manufacture at Barry, in South Wales, polystyrene and modified polystyrenes under the Dow Company's patents. British Resin Products, Ltd., a wholly owned subsidiary of Distillers, will be appointed sole selling agents for the new company. The Directors of Distrene, Ltd., nominated by Distillers are: Major C. J. P. Ball, Mr. H. H. Woolveridge, Mr. P. A. Delafield, Dr. J. J. P. Staudinger, and by Dow: Mr. N. R. Crawford, Dr. William H. Schuette, and Mr. A. E. Young.

PRECISE WEIGHING.—Recently published by the Stationery Office for the Department of Industrial Research is No. 7 in the Applied Science Series "Balances, Weights and Precise Laboratory Weighing." The National Physical Laboratory at Teddington is responsible for maintaining the standards of mass and does a great deal of testing of weights and balances. This long experience is the basis of the booklet, which has been written to assist people in industry and research laboratories concerned with price weighing. It contains exhaustive information on knife-edge and other types of balance, on their maintenance and on methods of testing their accuracy.

NEW 1-OZ. INJECTION MOULDING PRESS.—A leaflet has now been published describing a new press, shown for the first time at the B.I.F. this year, manufactured by Chelton (Electrostatics), Ltd., Marlow, Bucks. The price ranges from £727 to £895 and the press has been designed to satisfactorily mould a wide range of thermoplastics including nylon, Kel-F and cellulose acetate butyrate. Its prime function will lie in laboratories, experimental departments and prototype shops, but short production runs can be successfully carried out. The press is a two-column down stroking machine, operating on the injection ram differential locking principle, fitted with draw bars for injection cylinder return, tool opening, and moulding ejection. The hydraulic ram is of the double acting piston type and exerts a maximum of 12,500 lb. on the injection stroke, and 9,200 lb. on the return stroke. Standard automatic opening split bolsters are available to give increased locking pressure if and when withdrawal of multicores is necessary. These can be of great assistance in the simplification of tool making and reduction of tooling costs.

A wide range of injection pots is available, each being designed for a specific purpose. A special non-bleeding pot is available for nylon.

Temperature control is by means of five independent thermostat units producing a stability to within plus or minus 1° C. in the temperature range 20 to 300° C.

Press operation is by one lever only. The guard is fully interlocking and the entire unit is designed for simple maintenance.

MERGER OF PERMALI, LTD., AND HORDERN - RICHMOND, LTD.—The Directors of Permali, Ltd., announce that, subject to the necessary consents being obtained, a merger has been arranged between the company and Hordern-Richmond, Ltd. Mr. Lawrence Robson, Chairman of Hordern-Richmond, Ltd., will join the Board of Permali, Ltd. Permali, Ltd., whose shares were marketed in February last on the London Stock Exchange, are manufacturers of densified wood laminates and bakelized paper products, primarily for electrical insulating purposes, under the trade names "Permali" and "Dialam" and Hordern-Richmond are manufacturers of "Hydulignum" wood laminates and other products for the aircraft, textile and engineering industries.

NEW BRITISH VISQUEEN, LTD., PLANT AT STEVENAGE.—"Visqueen" film is now being produced by British Visqueen, Ltd., in their new factory at Stevenage, Herts, which is the largest polythene film manufacturing unit in the world outside the U.S.A. The company's products include "Visqueen" C, a specially surface-treated film which overcomes the problem of print adhesion. This film is available at no extra cost.

During the next few months "Visqueen" will be introduced in tube form up to 100-in. layflat width and up to 200 in. as sheet. These large sizes will open up new markets, as they make it possible to cover large areas at low cost.

The opening of the factory initiates a new phase in the development of thermoplastic packaging films in this country. After five

years development work by Imperial Chemical Industries, Ltd., with "Alkathene" film, made on a pilot plant scale, a market had been created of sufficient size to justify large-scale continuous operations. To meet this situation, just over a year ago Imperial Chemical Industries, Ltd., pooled resources with The Visking Corporation of the U.S.A. to form British Visqueen, Ltd. This company's new factory incorporates the best features of manufacturing methods evolved in Britain and in the U.S.A. These enable large tonnages of "Visqueen" (which has replaced "Alkathene" film) to be made in a wide range of sizes, and at lower cost. In anticipation of production economies, "Visqueen" prices were recently substantially reduced.

British Visqueen, Ltd., will not convert "Visqueen" film into bags, liners, printed reels, etc. It is their policy to provide the package manufacturing industry as a whole with film which will perform efficiently and economically on automatic machinery, and at prices based on continuous large scale operation.

Scientific quality control from raw material to finished film is a feature of all "Visqueen" production. Technical staff, supported by laboratory facilities and the technical and research resources of Imperial Chemical Industries, Ltd., and The Visking Corporation, can give advice and service to customers on all packaging problems. The service includes performance data and method of use, development of new applications and packaging engineering matters generally.

NEW COMPANY FORMED.—British Insulated Callender's Cables, Ltd., announce the formation with W. T. Glover and Co., Ltd., of British Insulated Callender's (Submarine Cables), Ltd., to specialize in the design and manufacture of submarine power cables. The registered office of the company is Norfolk House, Norfolk Street, London, W.C.2, and the chairman is Mr. W. H. McFadzean.

PRESTWARE LTD.—We understand that as part of the development programme, the company has now taken a further 30,000 sq. ft. of space at Raynes Park.

HESS PRODUCTS, LTD.—The telephone number of the company's head sales office in Leeds has been changed to Leeds 30194.

EDWARD DAVIES (PLASTICS), LTD.—The new address of the company is now 20 All Saints Road, London, W.1. Warehouses have now been established at 7a West End Lane, London, N.W.6, and 83a Cable Street, London, E.1.

W. CANNING AND CO., LTD., now have new premises in Sheffield, at 1 South Parade, Shalesmoor. Extensive structural alterations have been carried out in order to accommodate large stocks of materials necessary to meet increasing requirements of the plating trade in the north.

PLASTICS WASTE MERCHANTS ASSOCIATION.—At an informal meeting held recently in London, the question was discussed as to whether or not an association of plastics waste merchants might serve a useful purpose. It was thought that such a body would have an advantage in approaching both transport authorities and Government departments on matters of furthering general interest to the trade. Amongst those present at the meeting were Mr. L. W. Bottomley (A. Schulman Inc. Ltd.); Mr. E. R. Davies (Edward Davies (Plastics), Ltd.); Mr. D. C. Begg (Edward Davies (Plastics), Ltd.) and Mr. M. S. Stevens. Other members of the industry interested in this project are invited to contact Mr. David Begg at Davies Bros. (Metal and Plastics), Ltd., 20 All Saints Road, London, W.1.

MR. C. M. EDWARDS has been appointed home sales manager to B.X. Plastics, Ltd.

KLEESTRON, LTD.—On September 1, Mr. Harry Kleestron was appointed a director of the company.

MR. N. F. PATTERSON has been appointed a director of Monsanto Chemicals, Ltd. He joined the company in 1946, became works manager at Ruabon in 1947, and in July, 1949, was appointed general manager of production with responsibility for all production operations of the company. Mr. Patterson is also a director of Monsanto (Soil Conditioners), Ltd., and of Monsanto Plastics, Ltd., subsidiary companies.

Mr. M. Mellor

MR. M. MELLOR, well-known Manchester buyer of textiles to the rainwear, waterproof and clothing industry, has been appointed as Northern area sales manager to Rubber Improvements, Ltd., as successor to Mr. W. J. Reynolds.

POLY-TAINERS CONTRIBUTE TO ATLANTIC RECORD.—Fifty one-gallon-capacity Poly-Tainers, lent by Industrial Appliances, Ltd., were used for carrying the water supply of the motor yacht Aries, which recently made the first double crossing of the North Atlantic ever achieved by a small power-driven craft. Only 61 ft. long, with a beam of 15 ft., and displacement of 45 tons, this former lifeboat from Padstow, Cornwall, was provided with equipment, stores and provisions by over 70 British manufacturers who were anxious that a British ship should accomplish the first double crossing. Realising that polythene containers would be ideal for storing water because they are manufactured in one piece with no seams to leak, the directors of Industrial Appliances, Ltd., were delighted to supply them for the use of the four-man crew during their record-breaking voyage.

INTERNATIONAL PLASTICS EXHIBITION—OSLO.—During the international plastics exhibition to be held in Oslo from October 5-17, British Geon, Ltd., will be featuring numerous applications of Geon p.v.c. The number of their stand will be No. 25. British Geon, Ltd., will be represented by Dr. S. J. Skinner and Mr. G. C. Graver, Mr. S. Mottram, Mr. S. E. Bolam and Mr. M. S. Welling. A paper entitled "PVC Plastisols" will be read by Mr. Mottram during the conference.

PLASTICS FOR CONSTRUCTION.—A conference on "Plastics in Building," stressing the importance of plastics in home, industrial and institutional construction will be conducted by the Building Research Institute at the National Academy of Sciences in Washington, on October 27 and 28 this year. Sponsors are The Society of the Plastics Industry, Inc., the Manufacturing Chemists' Association and the Building Research Advisory Board. Among the uses to be investigated are plastics for piping, glazing, flooring, ceilings, walls and partitions, roofing, duct work, insulation and structural parts of buildings.

BRITISH GEON, LTD.—A special visit was made to the Barry plant of the company on July 6 by the coal trade. Visitors included the editors of various papers associated with the coal industry and representatives of the national press and the National Coal Board.

AERO RESEARCH TECHNICAL NOTES.—Bulletin No. 139 was published in July, entitled "Criteria for Designing Adhesive Bonded Joints." The article was originally published in *Product Engineering* for October, 1953.

"REDUX" IN FILM FORM.—The "Redux" bonding process, introduced by Aero Research, Ltd., in 1942, has now been used in some 40 well-known aircraft, apart from variations of the same basic machine. Service under flyng conditions covers a period of more than the past 10 years, a record that is not approached by any other structural adhesive for metals in the world, and there is thus justification for the claim that "Redux" alone has been proved in production and service not only for military aircraft but also on international air lines for over a decade.

This month, Aero Research, Ltd., announce the introduction of the adhesive in a new form which should contribute towards greater ease and economy in use. It consists of the identical "Redux" liquid and powder supplied as a film expressly, but not exclusively, for bonding metal skins to metal honeycombs to make the sandwich structures in which leading aircraft makers are now showing interest. "Redux" film, which is covered by specification DTD.775A, is supplied in rolls with protective covering and has a storage life of at least six months. For bonding panels to honeycombs, it is first consolidated onto the metal skin under

heat and vacuum pressure, with a sheet of aluminium foil placed between the film and the rubber blanket to prevent sticking to the rubber. The heating cycle for this operation is 10 minutes at 145° C After cooling, the aluminium foil is stripped off and a coating of "Redux" 120 applied by brush over the partially cured film. "Redux" 120 should also be applied to the edge of the honeycomb. The "Redux" 120 is dried at 80° C. for 30-60 minutes before assembling skins and honeycomb and curing the adhesive at 145° C. under vacuum pressure. The curing time will depend upon such factors as the thickness of the honeycomb and may be assumed to be about 1 hour for a ½-in.-thick honeycomb core sandwich, heated one side only.

Tests to destruction at room temperature have shown the failing load on lap joint specimens cured under a vacuum at 12 p.s.i. to be of the order of 4100 p.s.i. (specimens: 20 swg. DTD.546, 1 in. wide and ½ in. overlap, pickled to DTD.915A for 1 hour at 60° C., cured for 30 min. at 145° C.).

An important advantage of "Redux" film is that it ensures exact control of the proportions of powder and liquid in the bond, and this has resulted in improved strength at elevated temperatures.

"Redux" film can be used for normal metal-to-metal bonding processes, as for example in stringers to skins, and the curing cycle is 30 minutes at 145° C. It may be expected, however, that the main uses of the film will lie in the bonding of skins to honeycomb cores (for which purpose an adhesive is essential). It will be noted that in neither application is any priming of the metal surfaces required before application of the adhesive.

WARERITE IN SMALL SHIPS.—The accommodation for the master and crew of the new harbour tug "Caedmon Cross," built by Scott and Sons, is claimed to be of a higher standard than has been provided previously in such vessels. The messroom, cabin for the master, and the accommodation for engineer and crew are lined throughout with Warerite decorative laminated plastics panels. Warerite has also been used to line the bulkheads, berth-tops and desk-tops.

OIL AND COLOUR CHEMISTS' ASSOCIATION.—The 1955 Conference, devoted to the general topic of film structure and adhesion, will take place at Llandudno from June 7 to June 11. Amongst the people who are expected to read papers are Mr. P. D. Wright of British Industrial Solvents, Ltd., Dr. N. A. de Bruyne of Aero Research, Ltd., Mr. J. H. W. Turner of British Resin Products, Ltd. and Dr. J. H. Schulman. Dr. C. S. Hocking of the Department of Colloid Science of Cambridge University will also read a paper.

THE NATIONAL INDUSTRIAL FOOT SAFETY WEEK, will take place from October 25 to 30. The prime object is to encourage factory workers to wear suitable footwear while at work. The Royal Society for the Prevention of Accidents and Local Industries Safety Group have organized this safety week in view of statistics which show that at least one quarter of all industrial accidents cause injury to the feet or toes.

CORROSION AND PACKAGING.—Commencing on October 4, at 7 p.m., is a series of five lectures on corrosion and packaging. Organized by the Department of Applied Chemistry at the Northampton Polytechnic, the fee for the course will be £1 1s., and enrolment may be effected by post, addressed to the Polytechnic at St. John Street, London, E.C.1. Amongst the subjects to be discussed are "Introduction and General Principles of Corrosion," "Prevention of Corrosion," and "The Selection of the Packaging Method."

S.B.A.C. FLYING SHOW.—The flying display and static exhibition which takes place at Farnborough from September 6-12, will give prominence to a number of companies in the plastics industry. Amongst the exhibitors in the static exhibition will be Bakelite Ltd., and the plastics division of I.C.I. Ltd.

The Bakelite display will include laminated sheet based on paper, fabric and densified wood, for jigs, tool and machine parts, and high-pressure glass laminates with improved strength, heat resistance and electrical properties. A second group of exhibits will feature polyester resins and, in addition to such units as aerial masts and battery boxes, made by the low-pressure glass fibre/polyester resin laminating technique, will include a section of the radome made from Dufaylite honeycomb material and another made from Hycar expanded rubber sandwich construction. Both of these employ Bakelite polyester resin as the bonding medium.

Other items on display will include Vyback p.v.c. materials for cable sheathing, cocoon packaging and in rigid sheet form.

The I.C.I. exhibit will stress the scope of the technical service offered by the company's plastics division to the aircraft industry at home and overseas. Also to be seen on the stand will be examples of I.C.I. materials used in aircraft fabrication.

SALON DE LA CHIMIE.—A series of technical meetings will take place in Paris from December 3 to 22 this year. Amongst the topics to be discussed are recent developments in the plastics industry, new vacuum techniques and chromatography and ion exchange. The number of exhibitors will be greater than last year.

AKULON ROD.—The British Rawhide Belting Co., Ltd., announces that its warehouses in London and Liverpool are now stocking supplies of Akulon rod. The company has had considerable experience in the working of this material and will be happy to give advice in this respect.

CABLES FOR AIRCRAFT. — British Insulated Callender's Cables, Ltd., will be exhibiting on Stand 159 at the Farnborough Air Show this month. The ability of B.I.C.C. aircraft wiring cables to meet the extremely wide range of conditions experienced in modern aircraft will be the theme of the stand. Amongst the materials used by B.I.C.C. in their cable manufacture for aircraft are p.t.f.e. and nylon.

MR. J. M. FLEMING.—The Micanite and Insulators Co., Ltd., announce that Mr. J. M. Fleming, M.A., who joined the company in 1946 as chief development engineer and subsequently became director of research, has now been appointed chief engineer, in which capacity he assumes responsibility for the technical activities of the company.

BRITISH STANDARDS YEARBOOK.—The 1954 issue of the yearbook has now been published and copies may be obtained from the British Standards Institution, 2 Park Street, London, W.1, price 12s. 6d. The yearbook lists 2,500 British Standards current on March 31, 1954, and gives a brief description of the subject-matter of each. A comprehensive index simplifies reference. Information is also contained on the membership of the Institution's various committees, and particulars of the work in hand by these committees is also noted.

METHANOL BOOKLET.—A 16-page booklet on synthetic methanol has just been published by Carbide and Carbon Chemical Company, a division of Union Carbide and Carbon Corporation. It has been prepared for people in the chemical industry and contains information on the uses, physical properties, specifications and constant-boiling mixtures of methanol. Copies can be obtained from the organization at 30 East 42nd Street, New York 17, New York, U.S.A.

ASLIB.—The work of ASLIB for the year ended December, 1953, has just been reviewed in a pamphlet available from the offices of the organization, 4 Palace Gate, London, W.8. The report records the growing membership, now standing at nearly 1,600, and gives much interesting information on the work that is going on in the utilization of technical information.

FESTIVITIES AT STROUD.—Another successful day was spent on Saturday, August 21, when Erinoid Sports and Social Club held their 9th Annual Flower Show and Handicrafts Exhibition at Stroud. The chairman, Major C. Cleeve, and the managing director, Mr. John Harvey, were present. Visitors from the plastics industry included Mr. R. H. Cole, of R. H. Cole and Co., Ltd., Mr. Craxford, of Craxfords (Ramsgate), Ltd., Mr. Maitland, of B.X. Plastics, Ltd., and Mr. Jack Urban, of Monsanto Chemicals, Ltd. The weather remained fine, although heavy rain the previous night necessitated the fire-brigade pumping the ground dry.

PLAY-FAB, LTD., announce that their new address is 177 Bath Road, Cheltenham, Glos.

STANDARDS FOR CONSUMER GOODS.—A development of direct interest to the ordinary shopper is foreshadowed in an announcement by the British Standards Institution that it is to set up a Consumer Advisory Council. The Council is to be a source of information and advice, first to industry about the consumers' needs in relation to domestic and personal goods; and secondly to the public about the safeguards, in the way of standards and other facilities, available to them. The Council will work in close touch, through the established B.S.I. Committees, with the women's national organizations and with the industries producing consumer goods. It will be equipped to make the inquiries necessary to present those industries with clear statements of consumers' needs and wishes.

MEETINGS

September

11th.—Plastics Institute, South Wales and Monmouthshire Section. Works visit, Uskmouth Power Station, Newport, Monmouthshire. 10 a.m.

15th.—"New Moulding Plant and Machinery" and "Advances in Moulding Procedures and Mould Design for Melamine Materials." Speakers. W. R. Groves and J. Butler, A.M.I.Mech.E., A.M.I.B.F., F.P.I., British Industrial Plastics, Ltd. Plastics Institute, Yorkshire Section.

17th.—Ladies' evening—three short papers. Speakers. F. E. Wall, A.M.I.P.E., A.M.I.I.A.; L. A. White, A.S.M.A.; A. H. Woodfull, M.S.I.A. Plastics Institute, Midlands Section, Birmingham.

20th.—"Plastics in Coal Mines," D. N. Walker. Plastics Institute, London Section, Waldorf Hotel, Aldwych, London, W.C.2. 6.30 p.m.

21st.—"Vinyl Acetate and its Derivatives," Dr. O. Horn. Society of Chemical Industry, Plastics and Polymer Group, Rooms of Chemical Society, Burlington House, Piccadilly, London, W.1. 6.30 p.m.

October

4th.—"Plastics in Packaging," John Browning, B.Sc. Plastics Institute, Midlands Section, Bell Hotel, Leicester. Joint meeting with the Institute of Packaging.

7th.—"Nylons for Extrusion and Injection Moulding," Dr. J. F. Kohlwey. Plastics Institute, Southern Section, Polygon Hotel, Southampton. 7.30 p.m.

13th.—"The Uses of Plastics and Light Metals" read by D. N. Davies, B.Sc., A.M.I.Chem.E., for Plastics, and J. B. Wilson, B.Eng., A.I.M., for Light Metals, supper and discussion meeting. Plastics Institute, South Wales and Monmouthshire Section, Cardiff. 7 p.m.

13th.—"Some Newer Plastics Materials and their Uses," D. J. Gordon-Darnton, B.Sc., M.A., D.Phil., F.S.A.(Scot). Plastics Institute, Western Section, The Technical College, Gloucester. Joint meeting with the local branches of the Chemical Societies. 7.15 p.m.

Plastics in the Service of Man

The following is a list of full names and addresses of companies mentioned in the illustrated feature, "Plastics in the Service of Man," which appears on pages 290 to 293 in this issue:—

51. Household Equipment—2

W. E. Amies and Co., Ltd., Robert Street, Sheffield, 6.
B.X. Plastics, Ltd., Higham Station Avenue, London, E.4.
Bakelite, Ltd., 12 Grosvenor Gardens, London, S.W.1.
British Moulded Plastics, Ltd., Avenue Works, London, E.4.
Brookes and Adams, Ltd., Barr Street, Hockley, Birmingham, 19.
E. K. Cole, Ltd., Plastics Division, Ekco Works, Southend, Essex.
Craxfords (Ramsgate), Ltd., Ashburnham Road, Ramsgate, Kent.
Ekco—see E. K. Cole, Ltd.
Fibrolene, Weston Street, Bolton, Lancs.
Fraser and Glass, Ltd., Woodside Lane, London, N.12.
General Electric Co., Ltd., Kingsway, London, W.C.2.
Halex, Ltd., Higham's Park, London, E.4.
Godfrey Holmes (Plastics), Ltd., Wragby, Lincoln.
Imperial Chemical Industries, Ltd., Plastics Division, Welwyn Garden City, Herts.
Injection Moulders, Ltd., Westmoreland Road, London, N.W.9.
Lacrinoid Products, Ltd., Stafford Avenue, Gidea Park, Essex.
Mendle Brothers, Ltd., Pontygwaith, Rhondda, Glamorgan.
Norton Plastics, Ltd., Heanor Road, Ilkeston.
Prestware, Ltd., Lombard Road, Merton, London, S.W.19.
Runcolite, Ltd., 3 Vere Street, Oxford Street, London, W.1.
Gaby Schreiber and Associates, 7 Hobart Place, London, S.W.1.
Seaforth Engineering Co., Ltd., Oakhurst Road, Southend, Essex.
E. Shipton and Co., Ltd., Ferndown, Northwood Hills, Middlesex.
Smith Brothers (Wirewares), Ltd., Hall Green, Birmingham, 11.
Stone and Simmons, 73 Mortimer Street, London, W.1.
Streetly Manufacturing Co., Ltd., Sutton Coldfield, Birmingham.
Thermo-Plastics, Ltd., Luton Road Works, Dunstable, Beds.
Witton Moulded Insulation Works of G.E.C., Witton, Birmingham.

Courses in Plastics Technology, 1954—1955

London: Acton Technical College, High Street, Acton, W.3.

Advanced courses in the chemistry of plastics materials, and the technology of plastics materials, are held in the Chemistry Department; extending over two years, they form part of the recognised scheme for the Associateships examination of the Plastics Institute. Courses are also available in plastics machine and mould design, and other engineering subjects, in the Engineering Department. Facilities for practical work are available. The courses are part-time, and are intended for industrial chemists, engineers and others suitably qualified. The autumn term commences on September 20. Further details may be obtained from the Head of the Department of Chemistry.

London: Borough Polytechnic, Borough Road, S.E.1.

Two main courses are available. The first is a two-year full-time course leading to the Diploma of the Plastics Institute. Applicants should hold the General Certificate of Education in chemistry, physics, and mathematics at the ordinary level.

The second course covers a three-year period, on a part-time basis, and leads to the Full Technological Certificate of the City and Guilds of London Institute and to the Diploma of the Plastics Institute.

A fully equipped laboratory provides excellent facilities for practical work.

Full details of these courses may be had from the Head of the Chemistry Department.

London: National College of Rubber Technology, Northern Polytechnic, Holloway Road, N.7

The programme for plastics embraces a part-time three-year course for the City and Guilds of London certificate and the Diploma of the Plastics Institute, a two-year part-time course for the Associateship Examination of the Plastics Institute, and a full-time course for the Associateship Examination.

For the City and Guilds and Diploma course, students are required to hold the General Certificate of Education in chemistry, physics, and mathematics, at the ordinary level.

The part-time Associateship course is of two years duration for graduates, and three years for non-graduates.

The National College constitutes one of the most modern centres in the world and is fully equipped for practical work in polymer technology. Provision is made for suitably qualified students to undertake research.

The autumn term commences on September 27. Full details may be obtained from the Head of the College.

Birmingham: College of Technology, Suffolk Street

Courses at Birmingham include part-time day and evening studies and full-time day courses for the Diploma and Associateship examinations of the Plastics Institute and the City and Guilds of London Institute certificates. The College possesses well-equipped laboratories, and full particulars of dates of enrolments, syllabuses, etc., can be obtained by communicating with the Head of the Department of Chemistry. The autumn term commences on September 20.

Manchester: Newton Heath Technical College, Manchester, 10

Courses are offered both during the day and in the evening for the Diploma and Associateship examinations of the Plastics Institute and the certificates of the City and Guilds of London Institute. In the case of the former institute a two-year course, part time, is also offered covering the Associateship examination.

Full particulars of courses available can be obtained from the Head of the Applied Science Department. The autumn term commences on September 13.

Stroud: Stroud and District Technical College, Gloucester

The course offered prepares students for the Diploma of the Plastics Institute and covers a five-year period. During the first three years the student will take part in the National Certificate (chemistry) course or Intermediate B.Sc. Science Course. For the fourth and fifth years courses are arranged on two evenings weekly comprising the subjects of mould design and plastics technology.

Full details of times of enrolment, etc., can be obtained from the Principal of the College. The autumn term commences on September 20.

TALKING SHOP . . .

Plastics Raincoats. Under the heading of "Plastic Phenomena" a well-known newspaper recently drew attention to the use by the Royal Navy of plastics raincoats in place of the traditional black oilskins. Comment was made on the cost of these raincoats to ratings (stated to be approximately £3), as compared with the light civilian raincoats available in the shops at prices ranging from 7s. 6d. upwards.

The reason for such a disparity in price, if it exists, should be obvious. Raincoats, more properly called foul-weather clothing for use at sea, must be able to stand up to the most exacting conditions. I would not be surprised to learn that the weight of p.v.c. used for the Navy raincoats is at least five times that of the light civilian type. It is not surprising that they are more expensive.

* * *

New Styrene Plant for Britain. In the news pages of this issue we report the formation of a new company, Distrene, Ltd., to manufacture polystyrene under licence from the Dow Chemical Co., Detroit, U.S.A. This marks a further development in the manufacture of high impact and other polystyrenes in Britain. The new materials will be made available through the selling organization of British Resin Products, Ltd.

* * *

State of the Industry. How well has the industry recovered from the recession of 1950-1? A reader of the *Stock Exchange Gazette* recently asked for advice on the purchase of the shares of a certain well-known plastics company. The *Stock Exchange Gazette* seems to believe that the future is set fair for our industry and gave the following advice: "The Plastics Industry has experienced a remarkable change of fortune during the past year or so and current conditions are understood to be very favourable."

* * *

Swedish Plastics Car Body. The July issue of "'The Times' Review of Industry," reports the manufacture by a Swedish motorcar company, A. B. Volvo, of a new 2-seater luxury car with a plastics body. Fabricated from fibreglass reinforced material, the car is now going into production. The body weighs 200 lb., one-tenth of the total weight of 2,000 lb.

* * *

Flying Boat Cocooned. The last of the three 140-ton Saunders-Roe "Princess" flying boats, is to be cocooned shortly. Visitors to the Farnborough Air Show last year will remember the great impression that was made by one of these machines flying over at low level on only two engines. The area to be covered in the cocooning of this last aircraft with plastic film is 22,000 sq. ft.

Ancient Industry Transformed. Under the heading "Developments in Industry," the *Statist* recently drew attention to the transformation that has taken place within the British chemical industry. At the time when the *Statist* was first published some 20,000 organic compounds were known to exist: today the figure is around half a million. One of the developments which has contributed to this tremendous growth is the plastics industry, which, although it owes its general beginnings to celluloid in the 1870s, first assumed major dimensions in 1908 when Dr. Bakeland patented his process for the production of phenol-formaldehyde. The *Statist* attributes the major growth of the plastics industry to the emergence of radio, which has called more and more for materials possessing high strength and high insulation capacity. As a development of this the electronic field has stimulated the development of such materials as polythene and polystyrene. Today the field is spreading so fast that it is almost impossible to keep abreast of the developments.

* * *

Inflammable Fabrics. The U.S. Flammability Act, which came into force on July 1, makes it unlawful to sell or to import into the United States apparel fabrics or articles of wearing apparel which are highly inflammable. The *Textile Weekly* recently described the major provisions of the Act, and a duplicate of the U.S. flammability tester, which has been recognized by the Act as a means of determining the degree of inflammability, is to be installed by the Manchester Chamber of Commerce. British exporters can have their fabrics tested here and duplicate certificates showing the results of the test will be provided.

* * *

Plastics Shoes a Danger? Dr. J. L. Burn, School Medical Officer of Salford, Lancs. was recently reported in the *Daily Sketch* as saying that girls who cannot resist wearing pretty plastic shoes should think again, since their feet become sore and more readily infected.

This is the sort of statement that should be investigated, if it has not been already, and answered, by the Boot, Shoe and Allied Trades Research Association. Much useful work in the development of suitable plastics for footwear has been carried out by the Research Association in recent years.

* * *

Man-made Fibres. Reported, inter alia, by the *Belfast News-Letter* recently was the address of Sir William Palmer, chairman of the British Man-made Fibres Federation at the opening dinner of the Federation's conference at Oxford. Sir William estimated that man-made fibres now provide nearly 20 per cent. of all textile fibres used in the world. British production of synthetic fibres had increased 60 times since the end of World War I. This was in effect a tribute to the British synthetic industry and it may be expected that with the rapid development of the latest materials, such as Terylene, we shall see greater progress still.

* * *

A Plastics Pedograph. The issue of *The Lancet* for August 7 records a development at the Anatomy Dept. of St. Thomas's Hospital Medical School, London, of a pedograph. Designed to provide records of the vertical forces beneath each part of the foot during walking, it consists of 640 vertical rods of transparent Perspex, each 6 in. long and $\frac{3}{8}$ in. square in cross-section. These are packed within a Perspex jacket to form a block 15 in. long, 6 in. high and 6 in. wide. Beneath the rods is a thick slab of foam sponge rubber. The essential feature is that each rod is scored with a horizontal line, the line on every member of one row being $\frac{3}{8}$ in. higher than that of the next row. The block is inset within a wooden platform 9 ft. long and illuminated from one side. On looking into the opposite face one obtains the impression that it is a page of graph paper made up of $\frac{3}{8}$-in. squares. When a person walks upon the platform, planting one foot upon the apparatus in the process, some of the rods are momentarily depressed, and the corresponding horizontal lines on the graph paper are seen to descend. Thus a full-size impression is produced of the overlying foot. The movement of the Perspex rods is recorded by a ciné-camera set 12 ft. from the machine, taking 30 frames per second.

* * *

Plastics and the Gas-Turbine Car. I have received reports of progress with the gas-turbine car. The first Rover version made its appearance some four years ago; and recently in America, the Chrysler company showed a coupé fitted with a gas-turbine engine. One of the latest in the field is produced by the Fiat company and received great attention at the Turin Motor Show. It is interesting to note that this particular model has an overall weight of 2,200 lb., having a plastic body, presumably a polyester/glass fibre structure.

* * *

Raincoat Production Up. One of England's wettest summers has brought happiness to at least one branch of industry—plastic rainwear has been more popular than ever, and I read recently of one manufacturer who doubled his output and still experienced difficulty in meeting orders.

* * *

New Chairman for the Bath Club. Sixty-year-old Sir Laurence Merriam, managing director of B.X. Plastics, Ltd., has taken over from Sir Clive Burn as chairman of the Bath Club in St. James's Street, London, W.1. During the war Sir Laurence was Controller of Plastics for the Ministry of Supply.

PLASTIKON

Educational Facilities for the Plastics Industry

By
J. MAITLAND-EDWARDS, H.M.I.

We have pleasure in reproducing Mr. Maitland-Edwards' address given before the conference on education at the Borough Polytechnic, London, on July 14, organized by the Plastics Institute.

1. Introductory

EDUCATIONAL facilities available to the plastics industry are not confined to those for plastics technology, and this survey will deal first with arrangements for education affecting industry as a whole before passing to courses designed specifically for those connected with the plastics industry.

School education may be called a preparation for living (albeit including earning), and should develop mental ability, skills and personality. Many have strong views on the current attainments of school-leavers, particularly in English and in arithmetic, in comparison with those of 50 years ago, but we must concede that even if the average 15-year-old of 1900 reached a higher standard in the three Rs (and there is a body of evidence against this), he would make a very poor showing if plunged into the speed and complication of modern civilization: in judging standards of attainment in specific subjects, our views should therefore be tempered by a knowledge of all-round performance. This is neither the time nor place to discuss at length modern trends in education at school, but it is significant that the present free secondary grammar school is enabling large numbers to go to the universities, where students have increased more than fourfold since before the First World War.

2. Colleges and Courses

Universities and university colleges provide chiefly full-time courses in the humanities, arts, pure and applied sciences and technology. Technology is becoming increasingly significant in university education, and the announcement made by the Chancellor of the Exchequer yesterday of extended resources for development in this sphere at Glasgow, Leeds, Manchester and Birmingham, following the Government's earlier decision to enlarge the Imperial College of Science and Technology, reflects national concern for increased provision for scientific and technological education. At present, from a total university annual intake of about 21,000 students, rather more than 2,000 graduate internally in technological subjects each year.

The universities also provide some part-time courses, mainly through their extra-mural or extension departments; these are frequently in the social sciences and sometimes in other subjects of high intellectual content. Courses in plastics technology have been organized by an extra-mural department, but these were, perhaps, an exception to the normal type of provision.

Part-time technological courses are more usually provided by Local Education Authorities with the support of the Ministry of Education or, in the special cases of national colleges, by the Ministry in co-operation with the industry.

Technical colleges are organized by the Local Education Authorities and vary in size, in range of work, and in proportions of full-time and part-time students. The small establishments of country towns may have a total of 400 or 500 students, and an upper level of work of ordinary national certificate or general certificate of education advanced level; while some large colleges of technology have, perhaps, 8,000 to 9,000 students, 400 or 500 attending full time, with courses to post-graduate levels. The London polytechnics, although assisted from public funds, have a large measure of independence; some have as many as 1,000 full-time students, many working for university degrees; others have developed more in the field of part-time courses.

According to particular local circumstances, the courses provided in technical colleges include post-graduate and internal or external degree and professional courses in science, engineering and commerce, courses in management studies and in various technologies, courses for technicians and craftsmen, and others for training in the clerical arts.

A characteristic of a good technical college is the close link which exists with local industry. Personal contacts between the college principal, his heads of departments and the leaders in local industry supplement the service given to the college by Subject Advisory Committees, which are normally representative of a range of local interests.

The main function of the technical college is to give instruction in subjects pertaining to the ultimate vocation of the student, which will frequently be of a technological, technical or commercial nature, rather than to duplicate full-time university provision. Although full-time courses leading to degrees in science are organized at many colleges, a more important function lies in the field of technology, and in the development of part-time day, evening and sandwich courses for those already engaged in industry and commerce.

The plastics industry has not shown uniformity in allowing students to attend colleges during the day for instruction in plastics technology. In the Birmingham area there has been considerable support for part-time day classes, but elsewhere the emphasis has been on courses provided in the evenings. In this respect, the plastics industry is lagging behind many other important branches; it is significant that part-time day attendance for the country as a whole has increased more than seven times since 1938.

A development which has already occurred in connection with courses devised for several industries may be of interest to plastics manufacturers. Sandwich courses, arranged to allow the student spells of full-time attendance at college interspersed with periods in industrial employment, have been shown to produce more broadly educated technologists who have an immediate grasp of the significance of new scientific and technological developments to the industrial situation, and also have a suitable attitude to problems of labour and management: frequently these men merit promotion to responsible positions at a relatively early age.

Details of a number of sandwich schemes were given at the 1953 annual general meeting of the Association of Technical Institutions and were published subsequently.* One works-based course, arranged jointly between the Birmid group of metallurgical industries and the Chance Technical College, Smethwick, has been operating since 1944 and is organized with attendance at full pay at the college for four-month periods during the first three years and for six-month periods during the final two years of the course. College attendance is also allowed for one day weekly during the time spent in the works to prevent students losing the maximum benefit of the full-time college instruction. Students passing through these courses take ordinary national certificates in metallurgy and in mechanical engineering at the end of the third year; at the close of the fifth year, the best students get higher national certificates in production engineering and in metallurgy. This scheme has been operating for sufficient time to enable some assessment of results, and the companies concerned are finding that many early students are already fulfilling expectations and are rising to positions of junior management within the organization.

Day attendance at technical colleges is dependent on employers allowing students sufficient time from work to travel to, and attend, the college. Practice varies from industry to industry and from firm to firm, but it is becoming increasingly common for companies to allow young workpeople one full day per week with pay for college attendance. In some instances the period is extended to two days, and some firms may require some measure of additional evening attendance as an indication of good faith by students. This system allows provision of broader courses than those depending on purely evening attendance, and also reduces the risk to the part-time student of uneven mental development during the adolescent years which has in the past sometimes led to permanent distortion of personality. Where a course is organized with attendance on at least one full day weekly, it may not be unreasonable for employers to require attendance on one additional evening; in some exceptional cases, where advanced study involves a considerable amount of practical or laboratory work, as much as two evenings additional college work may be

* "Sandwich Courses," H. V. Field and W. E. Pyke. A.T.I., 1953 (obtainable from Hon. Sec., A.T.I., The Polytechnic, Regent Street, London W.1).

necessary, but any requirement that the student should attend formal classes in excess of this is unreasonable as no time is left for homework, reading and general cultural development. If no attendance in the day is permitted, evening courses are wisely restricted to attendance three times a week, and the course may of necessity be longer and cover a narrower field.

Attendance at full-time courses is frequently dependent on the provision of suitable financial aid to the student. Of approximately 21,000 going newly to the universities each year, some 15,000 are assisted from public funds. State scholarships and local education authority awards are available to suitable applicants to give support which is adjusted according to the parent's means: independent college Trusts and industrial schemes also enable some students to take full-time courses. The plastics industry collectively and as individual firms has enabled a number of young men to take full-time university courses.

Students at technical and national colleges may also qualify for various types of scholarship. Technical State scholarships are open to those who have reached ordinary national certificate or general certificate of education advanced level in appropriate subjects by full-time or part-time study at an establishment of further education. The majority of the scholarships are provided to enable students to proceed by full-time courses to honours degrees or to appropriate technological awards, but some are also available for post-graduate study or research to candidates who have obtained a first qualification by part-time studies. The full-time course to be introduced next year, leading to the Institute's associateship, if of satisfactory duration and standard, might be approved as a course available for technical State scholars, who might qualify through a part-time diploma course.

Support given by the trustees of the industry's education fund has enabled bursaries to be granted for the full-time course at the Borough Polytechnic leading to the diploma of the Institute, and scholarships for the full-time course for the associateship at Birmingham College of Technology. Various national colleges have their own systems of governors' and industrial scholarships for students wishing to study the particular technologies with which the colleges are concerned; awards are normally only made to those following advanced or post-graduate courses or for research.

3. Systems of Certification

Full-time university students normally work towards university degrees or diplomas which are recognized nationally and often internationally. For many technologies there is no equivalent qualification yet, but deliberations with regard to a national award for technology have reached an advanced stage.

Individual colleges have schemes of certification which may have considerable local, or even national, standing, and which in the case of national colleges may well acquire an international significance. Two qualifications in plastics technology which have not yet been available for a sufficient time to receive wide recognition are the associateship of the College of Technology, Birmingham, which approximates to the associateship of the Institute in academic standards, and the certificate of the National College of Rubber Technology at the diploma level. The value of college diplomas depends considerably on the prestige of the institution concerned which may be built up by the maintenance of high standards for a considerable period; in some cases colleges appoint specialists from industry as external assessors to visit particular departments regularly to advise on developments and to assist in the maintenance of appropriate standards in examinations.

To enable students at many colleges to obtain certificates of recognized standing in a variety of professional subjects a range of national certificates and diplomas has been introduced over the past 35 years. The appropriate professional bodies and the Ministry of Education collaborate in considering staffing, equipment, syllabuses and curricula proposed by colleges and in moderating examination papers and assessing marked scripts to ensure a uniform minimum national standard in a diversity of schemes. The numbers of students passing through recognized courses have now reached large proportions and in 1953 nearly 12,000 students were awarded ordinary national certificates and over 6,500 higher national certificates, an increase of nearly four times and six times respectively, over numbers in 1938. Of particular interest to the plastics industry are the arrangements for the various branches of engineering, for chemistry and applied chemistry, applied physics, commerce, and management subjects.

In some areas local education authorities have co-operated in setting up regional examining unions, chief among which are the East Midlands Educational Union, Northern Counties Technical Examinations Council, Union of Educational Institutions, and Union of Lancashire and Cheshire Institutes. These bodies arrange for external examinations at many levels and in a variety of professional and craft subjects to be available to the colleges of supporting authorities and their certificates have an important local currency.

Of national and international repute is the City and Guilds of London Institute. Its activities in connection with examinations in the technology of plastics are but a tiny part of its total work which includes maintenance of an art school and a considerable interest in the City and Guilds College of the Imperial College of Science and Technology. The examinations organized by the Department of Technology have this year attracted more than 95,000 entries in over 200 subjects. Plastics examinations having rather over 100 candidates run side by side with subjects such as telecommunications which attract more than 32,000 entries.

The system of evolution of a new scheme is of some interest. Following evidence from industry, substantiated to an exploratory committee, of the need for a system of examinations in a particular field, an advisory committee recommends detailed schemes for examination syllabuses and arrangements. If approved by the Institute, after scrutiny by its examinations committee, these may promote the establishment in colleges of courses designed to lead to the examinations: the standing of the City and Guilds of London Institute normally guarantees a general acceptance of the value of any new awards. Schemes which have been introduced recently for chemical plant operatives and for laboratory technicians are of direct interest to the plastics industry.

Awards sponsored by professional institutions, such as the Plastics Institutes' associateship are usually regarded as the highest professional qualifications and are normally primarily dependent on the results of examinations conducted by the institution concerned. Varying degrees of exemption from these examinations may be allowed and a number of senior institutions grant exemption on a subject-for-subject basis to students holding appropriate higher national certificates. The Plastics Institute gives a considerable measure of exemption but requires that an applicant for associateship shall take the Institute's own examinations in at least the papers concerned with higher aspects of the technological subjects.

4. Education specifically for the Plastics Industry

While special research work in electrical engineering and in high-polymer science at universities and the attention given to the chemistry of high polymers in special degree courses may contribute something to education for the industry, very little is done to orientate the mechanical engineer or architect towards plastics.

Occasional special short courses are organized by extra mural departments of universities and by technical colleges which serve a valuable function in giving back ground information to local industry and in introducing knowledge of new developments. The normal pattern of plastics education has, however, been through systematic part-time courses at technical and national colleges, leading, at the lower level over four or five years, to the City and Guilds of London Institute full technological certificate, and/or the Institute's diploma; or at professional standard to the Institute's associateship by a three-year course for a diploma holder, or a two-year course for a graduate in science or engineering. The high level of the associateship course has recently been acknowledged by its recognition at two centres for an increased rate of grant by the Ministry of Education under its Circular 255 relating to the provision for higher technology.

New developments include the full-time course at the Borough Polytechnic, which has initially attracted 14 students who will attend for two years to take a course so organized as to lead to the Institute's diploma, and to G.C.E. advanced-level examinations. Students satisfactorily completing this course should have received a sufficiently broad scientific education to form a good foundation for further part-time or full-time study for the associateship. The first full-time course for the associateship of the Institute is projected to start next September at the Birmingham College of Technology, where it will lead also to the associateship of the college. The course is provisionally organized on a

All over the world

the name *BEETLE stands for the

highest quality in

Aminoplastic Moulding Powders

B·I·P GROUP

BRITISH INDUSTRIAL PLASTICS LTD., 1 ARGYLL STREET, LONDON, W.1

* 'Beetle' is a trade mark registered in Great Britain and in most countries of the world.

chicken-livered

when this toy is broken

(which will be soon) there'll be sharp, cutting edges—edges that can cut a child. Parents remember—and all plastics toys get a bad name

lion-hearted

this toy won't break

in transit or in the nursery. And it can't break with a jagged edge (because it's made with Courtaulds' cellulose acetate: almost indestructible). Parents remember — come back for more plastics toys.

has all these advantages

safe

non-toxic

extremely tough and durable

no fire risks

unlimited colours

Courtaulds

cellulose acetate moulding powder

Plastics division: Little Heath, Coventry. Tel: Coventry 88031
16 St. Martin's-le-Grand, London, E.C.1. Tel: Monarch 8811

Courtaulds' Technical Service
welcomes your enquiries about any aspect of plastics.

two-year basis and some 12 applications have so far been received.

It is significant that sufficient recruits to enable the commencement of full-time plastics courses have come forward only when funds for student maintenance have been available from the industry. It is also significant that at present the entry conditions for these courses, and the standards asked of students who apply for financial assistance are considerably lower than those required for university courses.

Specialist courses in plastics technology in this country are at present available at the main areas of concentration of the industry. To provide a satisfactory course, a college must have appropriate staff, premises, equipment and the services for the equipment. Difficulty in recruitment of suitable specialist staff and the high cost involved for specialized premises and equipment cause reluctance to start courses unless a regular and appreciable annual flow of students can be assured. The number of centres where this continuous flow has been proved is limited to three in London and two elsewhere.

Acton Technical College started the first course for the associateship of the Institute in 1948. It has specialized at this level of plastics instruction and new premises, including improved specialized provision for plastics, should be available by September, 1956. The Borough Polytechnic held the first course specifically on plastics in 1930: the first full-time plastics course in this country was held there during the war and the new full-time diploma course commenced last year. The National College of Rubber Technology, as successor to the rubber section of the Northern Polytechnic, may claim to have carried out the first systematic instruction in plastics in this country as part of the rubber courses in 1915. This college is, perhaps, the best-equipped in the world for instruction in plastics subjects. The College of Technology, Birmingham, holds regular part-time day courses leading to the City and Guilds of London Institute full technological certificate, and the first full-time associateship course is proposed for the 1954-55 session: a new building will ultimately be available to accommodate the extensive range of plastics equipment already in use. Plastics education in Manchester commenced at the College of Technology, but has of recent years been conducted at Newton Heath Technical College, which is the only centre in the country at which courses in plastics, rubber and paint technology are simultaneously available: considerable benefit may accrue to the student of plastics technology through informal contact with education in these related spheres.

Although classes have been held from time to time at Stroud and District Technical College, the concentration of industry in that area is at present not sufficient to give a large enough regular flow of students for fresh courses to be started each year. A limited range of equipment has been provided, and plans for the later phases of the new college include, at present, specialized rooms for plastics. It is likely that Cardiff College of Technology and Commerce and a college in the Merseyside area will ultimately provide regular courses in plastics subjects and practical facilities will be arranged at both these centres if there is satisfactory evidence of a regular flow of students. Some provision for plastics education is also made at Wednesbury County Technical College and at Stow College, Glasgow.

When new workshops and laboratories for plastics instruction are being considered, possible joint use by students of rubber technology and paint technology has a bearing on the economics of the situation, particularly if numbers in courses are likely to be small. The total number of plastics students in the country at present is probably between 250 and 300. Forecasts of future production of plastics materials indicate that by 1975 it may have reached four times its present level, and to reach and maintain this volume a considerably larger number of technologists will be required than are at present available. The local education authorities and the Ministry of Education will co-operate in providing facilities if the demand for plastics education grows as a result of new developments, but full care will be exercised to ensure that classes are likely to continue, as in two instances, centres which have been equipped for plastics technology following a high initial demand have been obliged to close courses as a result of an insufficient regular annual flow of students.

Any discussion of facilities for plastics education would be incomplete without mention of the Institute's major contribution. The general stimulus of its progressive education scheme and the value of its sectional and national lectures is great, although not easily assessed. Its early administration of an apprenticeship scheme and its service in assisting the trustees of the industry's Education Fund to provide training grants, scholarships and bursaries, capital equipment for college laboratories, section libraries which are frequently housed in colleges, free monographs for students, have made a major contribution to plastics education in this country.

5. Prospects

Indications from a number of authoritative forecasts show that if this country is to continue as a major power, the size of the industry is likely to increase considerably over the next 20 years and numbers of technologists required for this increase will probably be considerably greater than those employed by the industry at present. Expansion is not likely to be confined to the plastics industry and, as no marked increase in population is expected, significant growth and technological advance generally will depend on redeployment and will only be possible if present numbers of people are trained to a higher level—in fact, to the limit of their capabilities. An extension in education of this type will require developments, not only in numbers of courses, but also, and perhaps even more, in the type of instruction provided. Full-time courses have been started, and the initiative must now rest with the colleges to develop broadly based courses, possibly in chemical engineering with a bias towards plastics, rather than specifically in plastics subjects. With the colleges also must remain the major initiative for special short courses on recent developments which will carry additional significance if based on research work conducted in the colleges. But full-time provision is possibly not the greatest contribution which education can give to the industry: the development of sandwich courses should receive careful consideration, and firms, individually and collectively, should assess the value of industrial experience contemporaneous with college instruction with a view to establishing courses for works-based students selected, possibly, on the results of their ordinary national certificate or diploma examination. At present the industry is not fully and uniformly aware of the benefits which can accrue from systematic technological instruction. The Education Fund of the industry augurs well for the future, but an increase in direct participation through widespread part-time day attendance of students and, possibly, through the development of sandwich schemes of education is of no lesser importance.

SILICONES AS RELEASE AGENTS FOR THE PLASTICS INDUSTRY

(*Continued from page 297*)

The urea-formaldehyde and phenol-formaldehyde adhesives that are used in the manufacture of plywood if allowed to set on the platens of moulding presses are extremely difficult to remove. Prior treatment of platens with a silicone overcomes this.

The ethoxyline resins are efficient bonding agents and present a difficult release problem when they are used as casting resins. A silicone compound applied to the surfaces of the mould enables the casting shown in Figure 2 to be removed.

Finally, it should be recorded that the release properties of the silicones can be a disadvantage. It has been found that very slight amounts of silicone remaining on a finished article may make it difficult for subsequent painting or varnishing operations. The silicone film can usually be removed easily by wiping with solvent or immersing the part in an alcohol-sodium hydroxide solution, but the danger of contamination should be guarded against.

Conclusion

The use of silicones as release agents for plastic materials is relatively new and considerable progress may be expected, but it is unlikely that the cost of silicone materials will be appreciably reduced in the next few years because of the difficulties in manufacture. Nevertheless, the silicones are effective at such low concentrations that they can compete economically with most of the more usual organic release materials, and the high initial cost is only an apparent deterrent to their use.

The author wishes to acknowledge his gratitude to Midland Silicones, Ltd., for permission to use the data given in Table 1, and to Vickers-Armstrongs, Ltd., Aero Research, Ltd., and Menrow, Ltd. (an associate company of J. and E. Arnfield, Ltd.), for permission to use Figures 1 and 2.

PATENT REVIEW

The following abstracts have been made from specifications at the Patent Office with the permission of the Controller of H.M. Stationery Office. The country of origin for Convention Applications is shown in parentheses. Complete specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 2s. 8d. each (including postage).

B.P. 709,687. Inflatable boats. L. G. R. R. de Villeneuve la Colette (France).

A hull of flexible (plastics) sheet material contains lengthwise-arranged inflatable air chambers. The chambers, when inflated, are no longer than the hull and flexed upwards. Hull and air chambers may be of polyvinyl chloride.

B.P. 709,688. Tray for use with stationery, E. S. Bennet (New Zealand).

Moulded from synthetic resinous material with vertical walls. The front wall is inclined, having a slot at the bottom to extract sheets from the staggered pack.

B.P. 709,702. Fastening means of the interlocking clasp type. F. G. Mitchell. To: Bulk Products, Ltd.

The strip-like members may be made, e.g., of flexible plastics (polyvinyl chloride), as two continuous rib-and-channel interlocking parts. The slider causes movement of the parts in a transverse direction into locking position.

B.P. 709,705. Moulding of polyamides in conventional injection moulding equipment. E. Ellery, B. J. Habgood, R. J. W. Reynolds. To: I.C.I. Ltd.

Known polyamides, at temperatures just above their melting points, are too fluid for easy handling. A small amount of 4-keto-pimelic acid (or amide-forming derivative) incorporated in a polyamide-forming composition makes the melts highly viscous over a wide range of temperature.

B.P. 709,824. Method for joining the ends of pipes of polythene or other thermoplastic material. G. R. Christian.

A lining of soluble material is inserted into the opposed ends of two pipes sufficiently resistant to withstand the heat of welding. After the welding, the lining is dissolved by passing a liquid solvent through the pipes. The lining may be a carbohydrate (sugar) or a starch compound, etc.

B.P. 709,841. Control apparatus for film slitting machines. To: La Cellophane S.A. (France).

The position of a cradle holding a (wide) roll of film is controlled by a nozzle close to one edge of the film. A slot on the nozzle is covered to a certain extent when the film is in a datum position. When the edge deviates the pressure in the nozzle line varies and operates a pneumatic servo-relay controlling a hydraulic servo motor.

B.P. 709,872. Production of threads, hairs, bristles and the like from polyvinyl chloride solutions. To: Badische Anilin- und Soda-Fabrik (I. G. Farbenindustrie A. G.) (Germany).

Especially good mechanical-technological properties obtained by solutions of a certain degree of polymerization and of other certain values dependent on concentration and proportion of lower polymers.

B.P. 709,875. Mirror. To: Spiegelglas Union A.G. (Germany).

Mirrors with a reflected image showing against a dark background. The motif is applied directly, by printing, to either the reflecting layer or the protective layer (sheet of transparent foil).

B.P. 709,898. Sliding clasp fastener. H. Heimberger, A. Bunger.

The fastener members are formed by clamp arms which engage from opposite outer sides over the edge strips to be connected. They may be of synthetic material while the edge strips are of rubber elastic beads.

B.P. 709,905. Calendar. H. C. Strong. To: J. Muller.

A "perpetual" calendar with three discs in a base and a viewing window in form of a prism.

B.P. 709,907. Method and means for forming joints between thermoplastic sheets. J. Pickering. To: Cascelloid Ltd.

Bags from flattened tubular thermoplastic material are made by stepwise advancing a continuous length of material, clamping and severing it to cut off a bag at the leading end, then applying heat to the exposed end for melting and coalescing.

B.P. 709,919. Process for continuous suspension polymerization. P. L. Shanta (U.S.A.).

The invention relates to vinyl compounds which are soluble in their monomers. These monomers, however, are relatively insoluble in the suspension medium. When such a compound, with a polymerization catalyst dissolved therein, is agitated in a non-solvent liquid, globules or droplets are formed that can be kept in suspension.

B.P. 709,948. Protective coverings for metal or other surfaces, H. W. Fender. To: Prodorite Ltd.

A sealing medium is filled into incisions where plastic (polyvinyl chloride) covering pieces overlap. The medium is secured by heating.

B.P. 709,952. Sprayable coating compositions. L. W. Crissey, J. H. Lowell. To: E. I. Du Pont de Nemours and Co. (U.S.A.).

The compositions are based on polymers of lower alkyl and lower glycol esters of methacrylic acid. Sprayable compositions are obtained by first subjecting the ester in the form of a heavy paste to a severe shearing and kneading action.

B.P. 709,982. Sterilized plastics. Wallington Weston and Co., Ltd., T. T. Clarke.

Refers to a self-sterilizing polyvinyl chloride with plasticizers and stabilizers and a certain thio derivative, in which an active bactericidal and opsonizing agent is produced by chemical action in the process of manufacture.

B.P. 709,983. Process for polymerizing kneadable pastes. To: Lonza Elektrizitätswerke and Chemische Fabriken A.G. (Switzerland).

It has been found that solidification of moulding powders, impressions on living bodies, dental fillings can be effected in the presence of a catalyst in a few minutes with the smallest possible evolution of heat, by using the polymer in the form of a quite definite granular structure.

B.P. 709,990. Thermometer scale. E. F. Rayner.

The plastics material, too flimsy when in a flat strip, is given a V-shape so as to be rigid enough to be secured to a tube by bands.

B.P. 710,009. Production of laminated films and sheets of vinyl chloride polymers. To: Badische Anilin- und Soda-Fabrik (I.G. Farbenindustrie A.G.) (Germany).

The sheets are lightly stuck together by an adhesive or by slight heating and pressure, then passed through a heated chamber, or under heat radiating surfaces, or over a hot rotating cylinder for such a short time that no sticking occurs. The temperatures are so chosen that the polymers employed become sticky.

B.P. 710,056. Stackable cups with handles. To: Porzellanfabrik Weiden Gebr. Bauscher, Zweigniederlassung der Lorenz Hutschenreuther A.G. (Germany).

A handle extension prevents lateral tipping.

B.P. 710,061. Closure for containers. A. Krautkrämer, L. Krautkrämer (Germany).

A resilient tubular nozzle is attached to the container and closed by a resilient cap. A tear-off seal may provide air-tightness.

B.P. 710,085. Method of embossing and colouring polyvinyl materials. W. H. Hogg, T. E. H. Gray. To: Dunlop Rubber Co., Ltd.

A leaf of a vinyl polymer which contains colouring matter is superposed on the polyvinyl material and a hot die impressed into the leaf and material, which are thus fused together.

B.P. 710,086. Plastic compositions. M. A. Pollack.

The invention relates to a modifier (phenyl oleate).

B.P. 710,093. Modified styrene compositions. H. Brunner. To: I.C.I. Ltd.

B.P. 710,110. Electrical capacitor. R. Davidson. To: Dubilier Condenser Co. (1925), Ltd.

The capacitor unit is inserted into a moisture-proof tube together with a mica washer and a sealing mass of thermo-setting plastic (ethoxyline resin "Araldite") which is baked (polymerized) in situ.

B.P. 710,130. Bowls and like vessels. I.C. Mitchell, S. S. Mitchell. To: Hale Ltd.

A bowl for flowers hanging on a tubular support for a source of illumination.

B.P. 710,167. Production of permanent patterned mechanical effects on textile fabrics. To: Heberlein and Co. A.G. (Austria).

A permanent chintz effect on non-goffered areas after applying a local goffered effect is produced by completely impregnating the fabric with a solution of a thermosetting resin precondensate (aminoplast) then drying and calendering the fabric and finally curing the resin.

B.P. 710,171. Printing processes using aminoaldehyde condensation products. H. Pike, M. Apley, F. Riesenfeld. To: Catalin Ltd.

B.P. 710,172. Painting processes using aminoaldehyde condensation products. H. Pike, M. Apley, F. Riesenfeld. To: Catalin Ltd.

B.P. 710,176. Illuminated signs. Harman Plastics and Engineering Ltd., H. E. Harman.

An edge illuminated sign with a lamp box and bent sheets of "Perspex."

B.P. 710,218. Synthetic resin moulding compositions. To: Chemische Werke Albert (Germany).

The same mechanical properties with better water resistance than that of cellulose-filled compositions are obtained by using "semi-chemical pulp," i.e. cellulose subjected to mild chemical treatment to loosen the bonding, then to mechanical treatment to separate the fibres. The pulp is then impregnated with melted or dissolved hardenable condensation products (of phenols, etc.).

B.P. 710,228. Vinylindene chloride copolymer composition. J. H. Reilly. To: Dow Chemical Co.

B.P. 710,271. Manufacture of thin-walled flattened thermoplastic tubing. British Xylonite Co., Ltd. Comm. from: Plax Corp.

The extruded and inflated tubing is subjected to locally exerted mechanical pressure on the exterior and interior so as to form a pleat along each side of the tube.

B.P. 710,324. Apparatus for delivering measured volumetric quantities of granular, pulverulent and like fluent solid materials. M. Locker.

The arrangement of spout and measuring cup permits the use of plastics mouldings of simple design and inter-engagement. The cup is integrally united with the baffle through rigid legs, the spout having a rim portion extending between baffle and container.

B.P. 710,331. Anti-sticking cellulose sheets or films, and process and sizing emulsions for their manufacture. To: American Viscose Corp. (U.S.A.).

B.P. 710,400. Saddles for cycles. J. Bergogno (France).

The seating surface is made of moulded plastic material (on a basic of polyamides) with thick rear and front portions for clamping it on to the saddle support.

B.P. 710,440. Process for reducing weak spots in resinous film or sheeting: To: Union Carbide and Carbon Corp. (U.S.A.).

Minute holes generally caused by small particles (dust, other electrically-conductive foreign matter) cannot be detected in pneumatic articles before the article is made up and inflated. The film is subjected to a high voltage electrical discharge to burn these particles, then calendered to eliminate the holes.

B.P. 710,453. Manufacture of plastics tubing. G. E. Green, A. R. Brinsley. To: British Insulated Callender's Cables, Ltd.

Electrical insulating sleeving of a wall thickness of less than 0.01 inch is made by forming a layer of plastic on a metal wire, then stretching the wire beyond its elastic limit to reduce its cross section and enable the plastic covering to be removed. Polytetrafluorethylene, and also polyethylene, polyvinyl chloride, etc., may be used with advantage as covering.

B.P. 710,470. Sealing of bottles and other containers. C. D. Waller.

A special form of a polythene wad.

B.P. 710,522. Sheaths for strip labels on file folders and the like. B. B. Posner. To: Shannon, Ltd.

The sheath is made, preferably by extrusion, of a plastic in a section having parts of varying thickness.

B.P. 710,524. Cleaning swabs and holders therefor. To: Personal Products Corp. (U.S.A.).

The holder (about 15 in. long) is made, e.g. of polystyrene.

B.P. 710,531. Method of making sponge material and resulting product. C. L. Wilson (U.S.A.)

Polyvinyl alcohol and formaldehyde are reacted in the presence of a acid catalyst and a finely divided polyvinyl formal added during reaction.

B.P. 710,571. Novelty fringe edging on fabric material and method of producing same. M. Salisbury.

A device is used fitting into the hand of the operator.

B.P. 710,574. Process for the treatment of plasticized cellulose ester sheeting. To: Celanese Corp. (U.S.A.).

Hot extruded sheeting is passed through the nip between unheated, hard-surfaced rolls kept below 100° F. The thickness of the sheeting is hereby reduced by at least 10%.

B.P. 710,576. Plastic moulding machine. To: Jackson and Church Co. (U.S.A.).

The machine has a vertical ram chamber and a horizontal processing chamber containing a propelling screw connected to a prime mover. Ram chamber and prime mover are independently mounted on a base. Prime mover and screw are connected by a flexible coupling. The processing chamber is secured to a bracket on a platen over the base.

B.P. 710,585. Containers for powdered and other substances. S. Lassman, D. Freedenburg.

A shell-like container with screw-in cap on one end and a spring-loaded ball closure on the other end.

B.P. 710,603. Dry battery cells. To: Soc. Piles Wonder (France).

The cell is enclosed in a cylindrical plastic sheath lined inside with a zinc electrode leaving the top end bare. The expansion chamber lies within this bare portion.

B.P. 710,679. Die casting and injection moulding machines. S. Smith. To: E.M.B. Co., Ltd.

To produce a slow speed of the plunger during the initial part of the stroke and a high plunger speed in the further operation, a hydraulic control is provided including a piston-controlled intermediate port in the cylinder and a by-pass between the end ports with an adjustable valve and two non-return valves.

B.P. 710,651. Feeding device for infants and invalids. R. G. Dowell, E. G. Gough.

B.P. 710,781. Caps and closures. W. R. Scott. To: Plastic Closures, Ltd.

The knurling comprises separate sets of right-handed and left-handed knurls.

B.P. 710,826. Casting foamed resins. To: Union Carbide and Carbon Corp. (U.S.A.).

A rigid bottomless shell is placed on the floor of a moulding pan, a thin sheet of expendable film (a new film for each new operation) taken for lining shell and pan floor, then the liner charged with the resin and catalyst stirred into the resin. When the shell is lifted and clears the liner, the liner collapses and the resin spreads radially over the floor of the pan.

B.P. 710,851. Dispensing fitments for bottles and other containers. To: H. J. Heinz Co. Ltd. Comm. from: Owens-Illinois Glass Co

A polyethylene insert between screw cap and bottle neck.

B.P. 710,856. Apparatus for welding together pieces of thermoplastic insulating material. J. E. G. Chapman. To: British Insulated Callender's Cables, Ltd.

Refers to the connection of the centre core of a composite polystyrene spacing element and the adjacent string ends.

B.P. 710,931. Plastics coverings on metal-sheathed electric cables. To: Osnabrücker Kupfer- und Drahtwerk (Germany).

Polyvinyl chloride strips helically wound with overlapping edges welded together by high-frequency heating.

B.P. 711,017. Toothbrush. E. Frieb, Eduard Frieb Mechanische Bürsten-und-Pinselfabrik (Austria).

Toothbrush combined with ear-pick.

B.P. 711,028. Dispensing holder for razor blades. Ever-Ready Razor Products, Ltd., C. F. Henley.

The stack of blades is held on a block fitting into the central slots. The blades are spring-forced upwards and the uppermost blade engaged by the ejector slide.

B.P. 711,046. Adhesives from hardenable aminoplasts. To: Badische Anilin und Soda-Fabrik (I.G. Farbenindustrie A.G.). (Germany).

A water-insoluble protein-rich product is incorporated.

B.P. 711,050. Laminated materials and method of manufacture thereof. K. Zuckerman.

The outwardly facing surfaces of the outer layers are pre-coated with an anti-stick agent.

B.P. 711,079. High-grade dielectric insulations from synthetic thermoplastic substances. To: Badische Anilin- und Soda-Fabrik (I. G. Farbenindustrie A. G.) (Germany).

A process for the foaming-up of polystyrene insulations to obtain an elastic insulating mass.

B.P. 711,183. Dual-purpose tray. E. P. Drummond.

An eight-shaped moulding for holding a glass and serving as ash tray.

B.P. 711,089. Manufacture of hair combs. T. B. Lewis. To: Aberdeen Combworks Co., Ltd.

The tooth comb components are moulded separately from the back components so that standardized mass-produced toothed components may be provided with an infinite variety of (coloured) backs.

B.P. 711,138. Holders for electric lamps. E. J. Sherwood. To: Simplex Electric Co., Ltd.

The surface of the skirt of the ceramic holder is coated, e.g. with non-abrasive plastic material applied by spraying or dipping to prevent scratching of the bulb when inserting it.

B.P. 711,144. Stands for electrical appliances. Arvin Electric, Ltd., H. L. Ranson.

An open-topped box for an electric dry shaver with recess for an electric connector composed of two mouldings.

B.P. 711,146. Rigid laminar articles of sandwich construction. R. J. Wareing. To: I.C.I. Ltd.

In the production, layers of glass cloth impregnated with thermosetting resin are produced. The resin is also used for bonding the layers to a core of expanded rubber (for radomes).

B.P. 711,150. Adhesives. J. A. Ross. To: Bakelite Ltd.

A vegetable tannin is used as an extender in a urea-formaldehyde adhesive to render it more resistant to moisture.

B.P. 711,167. Illuminated panels. C. N. Schlenker. To: E. A. Neugass.

Panel for aircraft instruments composed of a layer of transparent material, a layer of translucent material, and then an outer layer of opaque material cut away to uncover portions of the translucent layer defining characters. The opaque layer of elastomeric material is dark coloured and has a matt finish. The translucent layer is light coloured.

B.P. 711,186. Packaging of metal and other articles. G. E. Masters. To: George Salter and Co., Ltd.

Transparent envelope made from two sheets of polythene (Alkathene) or of polyvinyl chloride welded together.

B.P. 711,215. Packaging of colours or pigments. R. B. F. F. Clarke.

The colour or pigment is introduced into a tube of flexible transparent material (Alkathene) which has a higher softening point than the resinous base of the colour. The tube is heated to soften the colour and compressed laterally to convert the colour into a homogeneous mass.

B.P. 711,266. Process of manufacture of products from reinforced plastics material. To: S.A. des Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny and Cirey (France).

Glass (mineral) fibres are arranged parallel and wound on a drum. The material (polyvinyl chloride and/or copolymers) is applied during or before winding as an emulsion of such consistency as not to lose too much through centrifugal force and to retain in the finished sheet 65 to 75% of the plastics material.

B.P. 711,332. Caulking. A. H. Haraldsen.

Moulding strips of rubber or thermoplastic material of similar properties are introduced into grooves prepared between abutting edges of the deck planks of a ship.

B.P. 711,344. Production of filaments, films and like shaped articles from acrylonitrile polymers. A. Hodge, J. Downing, J. G. N. Drewitt. To: British Celanese Ltd.

The solution of polyacrylonitrile is extruded or cast (films, foils), then set by a coagulating medium having as a main constituent a liquid aromatic hydrocarbon or halogenated aliphatic hydrocarbon.

B.P. 711,371. Draught excluder strips, beadings, mouldings and the like. T. J. R. Bright.

B.P. 711,429. Apparatus and method for uniting layers of thermoplastic material. To: Packs Pty. Ltd. (Australia).

A number of materials suitable for food packages are not readily amenable to heat sealing because of their tendency to stick to the heated rollers. This difficulty is overcome by holding only restricted area portions in light contact and effecting fusing through heat radiation.

B.P. 711,437. Method of producing artificial sausage casings. To: Wolff and Co. Komm. Ges. a.A. (Germany).

A salt of alginic acid is used for preparing the casing (extruded sheet or tube).

B.P. 711,455. Shaving brush. R. Schieche. (Germany).

A handle serves as reservoir for liquid shaving soap. A piston operates in a cylindrical portion of the handle to control the discharge.

B.P. 711,460. Electric cables. To: Pirelli Soc. p.A. (Italy).

The stranded core of a submarine cable is passed through an extrusion head in which it is bent so that it opens out. The interstices between the wires are then filled with gutta-percha or polythene or a similar composition.

B.P. 711,465. Method of setting tacky thermoplastic adhesives to a non-tacky state. To: Brown-Bridge Mills Inc. (U.S.A.).

The adhesive characterized by non-tackyness at room temperature and by becoming tacky at a higher temperature, then remaining tacky for a substantial time on cooling down, is made from a fused film (resin and plasticizer) on a web which, on cooling, is set by the addition of the plasticizer used in finely divided solid form.

B.P. 711,471. Embossing devices for foil or other material. C. T. Hall, Molins Machine Co., Ltd.

A steel roller is used with a mating roller of thermoplastic material (cellulose ether or ester, polystyrene, polyvinyl resin, polyamide resin such as nylon, polyacrylic resin).

B.P. 711,499. Tool for mounting elastic sleeves on rods, cables, insulated conductors and the like. B. A. Thomas, W. C. Seaforth. To: Electrical and Musical Industries, Ltd.

Sleeves of polythene are expanded by a tool mounted on a pistol grip.

B.P. 711,510. Apparatus for moulding hollow plastic articles. D. G. Rempel. To: Soc. Française d'Etudes and de Recherches Techniques.

A number of mould units are moved through a series of zones for loading (liquid plastic), pre-heating (rotation of mould about two axes for uniform distribution on inner wall of mould), polymerizing by heat (mould stationary), cooling, article removing.

B.P. 711,538. Manufacture of vinyl copolymers. To: Lewis Berger and Sons, Ltd. (U.S.A.).

Coating compositions (impregnating, printing inks, linoleum) containing copolymers of styrene and drying oil acid radical containing components.

B.P. 711,543. Surface treating lacquer composition. G. B. Heijmer.

A lacquer for wood from urea formaldehyde or melamine formaldehyde resins and principally non-drying alkyd resins with nitro-cellulose and solvents. Formaldehyde resins 75% of alkyd resins, nitrocellulose less than 10%.

B.P. 711,545. Dull lacquer. G. B. Heijmer.

B.P. 711,548. Textile print wash blankets. To: Dewey and Almy Chemical Co. (U.S.A.).

A working layer of nylon and/or acrylonitrile polymer yarns adhesively united to a backing layer by a cushioning layer of rubber.

B.P. 711,549. Process of printing upon fabrics. To: Dewey and Almy Chemical Co. (U.S.A.).

B.P. 711,571. Fabric-covered dress accessories, such as buckles and buttons. G. E. Wardworth, Piccadilly Pleating Co.

Two moulded polythene parts are fused together while the covering fabric over one of the parts has been engaged between the meeting faces.

B.P. 711,592. Heat curable coating compositions containing epoxy ether compounds. L. W. Coveney, S. L. M. Saunders, J. Tryzna, Pinchin, Johnson and Assoc., Ltd.

Composition for coating metals prepared with polybasic hydroxy acids show stability over an indefinite period and high water resistance.

B.P. 711,639. Decoration of articles of personal use. C. J. Thomson. To: Aberdeen Combworks Co., Ltd.

A recess in the moulded handle portion of a toothbrush, comb, etc., for exhibiting a name or other sign, e.g., with a transparent covering panel.

B.P. 711,650. Cartridge case. J. A. P. Halnaut. To: Soc. Anon. Gevelot.

The base of the case is formed with strengthening ribs preventing deformation on cooling of the moulded material (superpolyamide or cellulosic material).

B.P. 711,714. Extrusion of cellulose acetate compositions. J. Allan, K. E. Wright, B. Shaw. To: British Celanese, Ltd.

The manufacturer of thick-walled tubes presents certain difficulties which can be overcome by incorporating 1 to 5% ricinoleic acid in particulate form in the plasticized composition. The composition is forced through a heated chamber and extruded into the air maintaining all the time a temperature gradient so that complete coalescence occurs before reaching the extrusion point. The tube emerges as a self supporting article.

B.P. 711,750. Ball type floats and their manufacture. W. and J. Lawley, Ltd., J. W. Gaunt Senr.

Two hemispherical shells of polyvinyl chloride welded rim to rim. A screw threaded ferrule is moulded in situ in one shell.

B.P. 711, 771. Manufacture of articles comprising an outer shell or casing and an interior plastic filling. B. Jablonsky.

Articles such as aircraft (helicopter) propellers, wings, tyres, balls or more intricate forms like lifeboats may be made with a filling composed of thermoplastic resin (polyvinyl chloride) 65%, plasticizer 15%, expanding agent 20%. A hardener (thermosetting resin) may be added before filling into the mould.

B.P. 711,796. Reservoir pens. J. P. Gowland. (Add. B.P. 670,182).

A moulded barrel with several ink reservoirs and a rotatable stem with a control passage to connect the desired reservoir with the ink duct.

B.P. 711,853. Plasticized polymeric vinyl or vinylidene halide composition and method of making same. To: General Tire and Rubber Co. (U.S.A.)

For films or thin sheets of high tear resistance.

B.P. 711,875. Mixing screw for plastic material. To: Jackson and Church Co. (U.S.A.)

The central section of the screw has an enlarged root diameter while the outside diameter of the screw remains the same as that of the two end sections. It is preferable to enlarge the root diameter progressively to a point midway and to have a thread of smaller lead in central and output sections of the screw.

Beautiful Yorkshire
No. 5

Greenhow Hill, Pateley Bridge

BIRKBYS LTD · LIVERSEDGE · YORKSHIRE

'Yorkshire Post' Photograph

"ELO" SYNTHETIC RESIN PRODUCTS

Embracing Completed Mouldings, Moulding powders, Resins, solid, powdered, or in solution, Insulating Varnishes, Cements, Lacquers, Anti-friction resins for fabric bearings, Casting resins, Capping cements, Filling Compounds, Sealing fluids.

London Office: 79 Baker Street, W.1.

BEST *Laminating Resins are...*

Ferguson's NESTOR Brand

Cresol 50% Water Solution . . . Z.470
For Impregnation and rapid cure.

Cresol 50% Spirit Solution . . . Z.439
For coating and high electrical.

Cresol Solid Resin Z.400
Soluble in spirit for coating and high electrical.

Send your enquiries to...

James Ferguson & Sons Limited
Lea Park Works · Prince George's Road · Merton Abbey
LONDON, S.W.19
Tel : MITCHAM 2283/7 **Grams : NESTORIUS SOUPHONE LONDON*

ECONOMISE IN TOOLING & PRODUCTION!

TOGGLE CLAMPS AT MAKERS PRICES

F. BRAUER LTD.

HARPENDEN, HERTS.

WRITE FOR CATALOGUE OR 'PHONE HARPENDEN 3603-4

OUR RANGE TODAY IS LARGER THAN EVER

MIX IT WITH THE ENTOLETER

Whatever the mixture you require, there is almost certainly an Entoleter to produce a uniform and intimate blend which is beyond the scope of conventional mixers. Recent successful applications include the blending of :— Moulding compound for gramophone records · Filled phenolic compound for the manufacture of plastic dishes · Filled vinyl moulding compound for the manufacture of storage battery cases, etc. The Entoleter can produce a finished mixture at rates of up to 200 lb./minute, and is easily incorporated as a final mixer in existing processing systems to cut mixing time, reduce costs and improve product quality. Send for leaflet IP1 describing this machine.

Entoleter Centrifugal Machines DISTRIBUTED BY *Henry Simon Ltd* SIMON ENGINEERING GROUP

STOCKPORT ENGLAND

HS127

Battenfeld

Injection Moulding Machines

FOR ALL THERMOPLASTIC MATERIALS

(ELECTRO-MECHANICAL SYSTEM)

FOR PARTICULARS, APPLY SOLE AGENTS :—

ED. BRAND, LTD. (PLASTICS DIVISION)

9, ST. CROSS STREET, HATTON GARDEN, E.C.1

TELEPHONE : CHA. 4091

We buy

SCRAP PLASTICS

which we re-work and sell as

LOW PRICE COMPOUNDS

for injection and extrusion

P.S.—and **re-working** means **really** cleaning, sorting, sifting and magnetically separating thoroughly, then hot mixed by milling or extrusion.

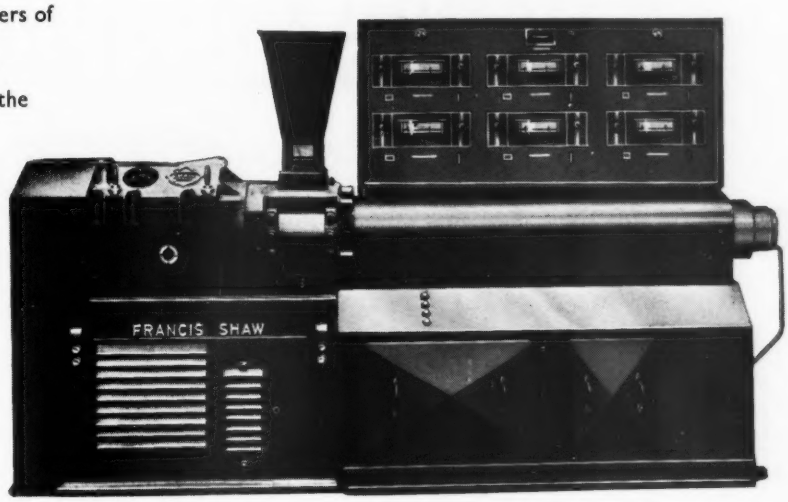
CAPLIN & CO. (PLASTICS)

10 BLACK PRINCE RD., LONDON, S.E.11

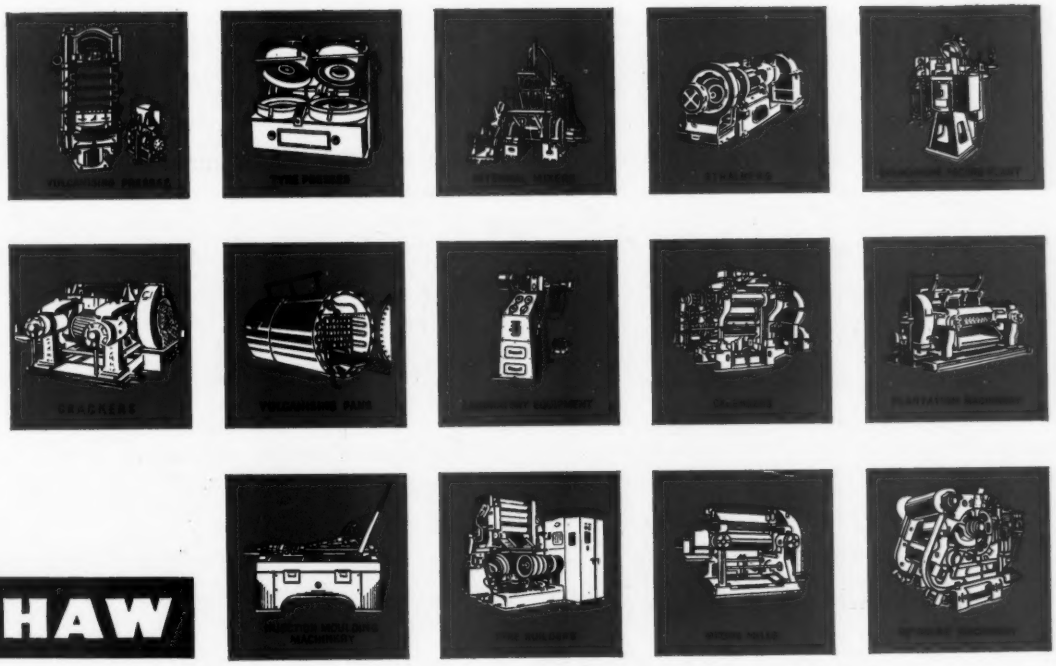
Telephone : RELiance 4833

the best in rubber & plastics machinery

Francis Shaw & Co. Ltd. are the world's leading manufacturers of rubber and plastics machinery. In 1879 we made and installed the first extruder ever used in the rubber industry, and we were among the pioneers of Plastic Extruding machines in England. To-day our range of machines for the rubber and plastics industries is the finest and widest in the world.



THE SHAW 4½" PLASTIC EXTRUDER



SHAW

INDUSTRY'S HEADQUARTERS FOR THE BEST IN RUBBER AND PLASTICS MACHINERY

FRANCIS SHAW AND COMPANY LIMITED, MANCHESTER 11, ENGLAND

TELEPHONE: EAST 1415/8 TELEGRAMS: CALENDER MANCHESTER

LONDON OFFICE: 34 VICTORIA STREET, LONDON, S.W.1 PHONE: ABBEY 5077/8 GRAMS: VIBRATE PHONE LONDON

4225

'Celanese' announce

an up-to-date range of

Cellulose Acetate Flake

including new and improved qualities

British Celanese Limited, the pioneers and largest producers of cellulose acetate, have a wide experience in its uses in the textile and plastics industries throughout the world. Their extensive research work and their direct knowledge of the applications of cellulose acetate have been combined in the production of a range of grades which will provide the maximum benefits in controlled and consistent qualities at keen prices.

The principal grades now offered are as follows, and advice on the employment of any individual grade will be gladly given to customers:—

CP2—for moulding powder, extrusion compositions, film and foil.

P2—for textile filaments and fibres.

CR1—for extrusion compositions, sheet, film, foil and lacquers.

CP2 LV and CP2 HV—for lacquers and paint strippers.

CR2—for moulding powders and extrusion compositions.

HA3—for moulding powders and extrusion compositions, yielding products of high dimensional stability.

Enquiries to:

BRITISH CELANESE LIMITED

Chemical Sales Department, Celanese House, Hanover Square, London, W.1

HUMMER

direct-to-mesh vibration gives better screening

- Use of electro-magnetic vibration reduces mechanical parts to a minimum; lowers maintenance.
- Particles stratified according to size giving maximum screening capacity.
- Wide range of sizes; with one, two or three decks.
- Screening down to 200 mesh. Cloth easily changed and tensioned.
- Can be controlled to suit material and load conditions.

INTERNATIONAL COMBUSTION PRODUCTS LTD

ICL

London Office: Nineteen Woburn Place, W.C.1

Works: DERBY, ENGLAND: PORT ELIZABETH, SOUTH AFRICA: SYDNEY, AUSTRALIA.

804

You make Lustrex any colour... this simple way!

"Dry Colouring" with Lustrex* Colourant Blend is an easy, economical method of producing polystyrene in any shade you require.

We should be pleased to arrange a personal demonstration — please write for details.

1 *Fill drum tumbler with Lustrex Colourant Blend.*

2 *Add dye to Lustrex Colourant Blend.*

3 *Mix by drum tumbling.*

4 *The Colourant Blend is ready for moulding.*

You need stock only one grade — Lustrex Colourant Blend — to produce all colours required. Less storage space needed, less capital tied-up. (*Registered Trade Mark)

Processing is easy; after mixing, the dyestuff adheres uniformly to the Colourant Blend granules. *It moulds without streaking.* Colourant Blend has all the advantages of Lustrex General Purpose — lightness, strength, washability, etc.— and the same low price! Lustrex Colourant Blend can be used to produce a wide range of toys, novelties, houseware and miscellaneous articles; it is particularly useful for short runs in special colours.

MONSANTO PLASTICS LIMITED,

911 Victoria Station House, Victoria Street, London, S.W.1.

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Ltd., Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Ltd., Bombay. Representatives in the world's principal cities.

MONSANTO

Regd.

* Get a grip on it . . .

. . . little things count.

Take this plastic handgrip for the door of
the RAYBURN solid fuel boiler, for instance.

Designers these days give as much attention to
small details as to the large ones, for
it is the small ones which finally stamp the finished product.

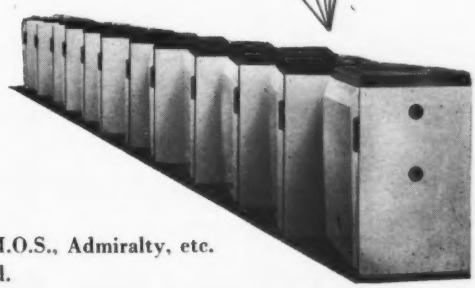
The feel of the handgrip will
help form the housewife's opinion of the boiler itself.

That was the idea behind the ROOTES design of
the handgrip for our customers, ALLIED STEEL PRESSINGS LTD.

The ROOTES organisation is self-contained.
It takes care of each article from the design stage
until it is completed—even to
the making of moulds and tools for individual jobs.

Let us know *your* plastics problem today.

* *From design to production within six weeks.*
ROOTES really got a grip on this job!



ROOTES

Contractors to M.O.S., Admiralty, etc.
A.I.D., approved.

SLOUGH · BUCKS · TELEPHONE: SLOUGH 22349.

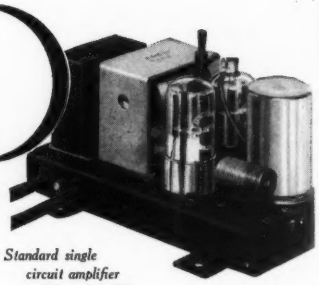
Smee's R 107

TEM-CON
Radiation Element

Specifically designed for the control of moving hot surfaces, such as rolls, the TEM-CON Radiation Element is just one example of the specialised application of TEM-CON elements.

TEM-CON *Temperature Indicating Instruments*
Neat and compact, with automatic cold junction compensation, 3 in. "easy to read" scale. Competitively priced.

What is the most accurate inexpensive and adaptable form of **TEMPERATURE CONTROL?**



Standard single circuit amplifier 4½" × 4" × 7½" overall.

So simple . . . a TEM-CON installation comprises two parts: a small amplifier, a sensitive element. So sure . . . the TEM-CON system controls temperature within ± 0.2 deg. C. So economical . . . the system offers standands of fidelity ordinarily obtainable only at much higher costs. And another great advantage is its ready adaptability. Thanks to the simplicity of the sensitive elements, available in a range of types and sizes, they can be built up from standard components to suit the individual job.

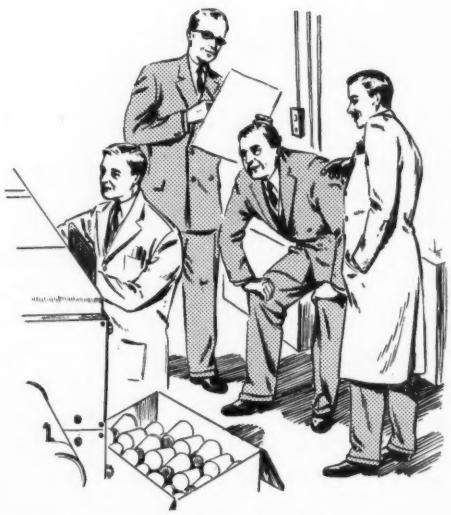
Your control problem might be solved by P.A.M. Write for our suggestions.

The **TEM-CON** ELECTRONIC SYSTEM *has the answer*

P.A.M LIMITED MERROW . GUILDFORD . SURREY . Telephone: GUILDFORD 2211
One of the group of Companies associated with the Southern Areas Electric Corporation Ltd.

LIFE TO-DAY—

is full of Plastic Mouldings
Many of them are by
J. F. KENURE



Mouldings in all thermoplastic materials up to 10 oz., including flexible moulding by the patented Kenutuf (P.V.C.) Process.

Tool design and precision mould making. Fully equipped modern tool room.

Capacity and facilities for fabrication, manipulation and assembly of plastic and metal components.

—CAN WE HELP WITH YOURS?

J. F. KENURE

J. F. KENURE LTD., FAGGS ROAD, FELTHAM, MIDDLESEX
Telephone: FELTHAM 2604/5/6

Concerning

VINATEX

P.V.C. COMPOUNDS

In General

Vinatex Limited manufacture a complete range of Polyvinyl chloride compounds which can be supplied in the form of chips, slabs or uniform pellets.

In particular

We make compounds for... Petrol resistant extrusions. Non-toxic extrusions. Rigid anti-shatter extrusions. Dielectric, direct insulation and sheathing purposes. High clarity extrusions. General purpose extrusions. Gramophone records.

In addition

We make polyvinyl chloride pastes, "Vinamold" hot melt compounds, "Vinagel" modelling and moulding materials and "Vinatex" Coated paper and cloth.

WE INVITE YOUR ENQUIRIES.

VINATEX LIMITED, Devonshire Rd., CARSHALTON, Surrey
Wallington 9282

VINATEX LIMITED IS A UNIT OF VINYL PRODUCTS LIMITED

V36

"Yes, I've checked these graduations most carefully....

"....I've never yet found the slightest inaccuracy in a 'PYREX' Glass graduated Burette, or in fact in any 'PYREX' graduated vessel."

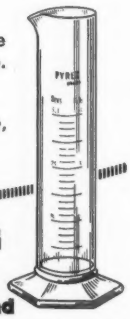
"Our work is rather special, so we always use Works Class A standard, but I am sure we'd be quite safe in using Works Class B at the lower cost. Of course we keep NPL Class A for all our research work."

"What about breakages?"

"Very few, Sir! You see, 'PYREX' can be made so much more sturdy and robust because of its low coefficient of expansion (actually 3.2×10^{-6})—and we never have breakage through heat, nor any sign of chemical attack."

● 'PYREX' Brand Graduated Glassware is made only by James A. Jobling & Co. Ltd., Sunderland.

● *Large new catalogue FREE. Send name, address, and position in firm.*



MADE IN ENGLAND PYREX

JAMES A. JOBLING & CO., LTD.

REGD. TRADE MARK **Wear Glass Works, Sunderland**

The only makers of 'PYREX' Brand Glass in the United Kingdom.

STUCK

with a sticky problem?

We have been solving sticky problems since 1908. And to our knowledge we have never come unstuck! Big and small problems alike get our expert, specialised attention. Take for instance the task of providing the adhesive for the "Onazote" (product of the Expanded Rubber Co.) insulating panels of the massive Vickers-Armstrongs Stratosphere Chamber, or on the other hand the simple duty of providing an adhesive to stick the sole on "Miss Smith's" shoes. Both problems demand the utmost in perfection.

We can provide the *right* adhesive for any job —Industrial or Commercial—and guarantee to do it reliably and efficiently.

However, should the right adhesive not be available from our impressively large range, Holdtite experts are at your service to produce a suitable adhesive, where possible, to suit your particular requirements.

You are invited to send samples of materials to be bonded: we will then advise the best adhesive to use.

HOLDTITE ADHESIVES

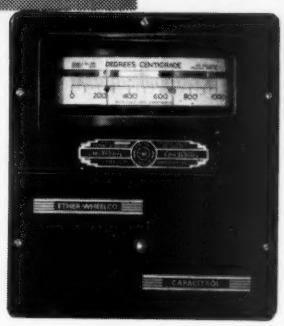
INCLUDE types for:—
Aircraft Industry · Boot and Shoe Industry
Coach Builders · Flooring Industry
Furniture Manufacturing · Motor Industry
Plastics Industry · Shipping Industry
Tiling, etc.

SURRIDGE'S PATENTS LTD

NEW WORKS · CROYDON ROAD
BECKENHAM · KENT
Telephones: BECKENHAM 0168 - 1313

Ether Wheelco ELECTRONIC CONTROLS

. . . for closer **CONTROL** of injection moulding **TEMPERATURES**



Most of the leading British and American Moulding Machines are fitted exclusively with Ether-Wheelco Electronic Controls for the automatic control of injection moulding machine nozzle temperatures. The "Capacitrol" (as illustrated above) controls electrically heated nozzle temperatures with the greatest speed and has greater accuracy than the mechanically operated type of apparatus. It is electronically operated, reliable, moderate in price. *Write for list No. 250*

ETHER LTD. TYBURN ROAD, ERDINGTON BIRMINGHAM 24 Phone: EAst 0276-7

PIONEERS OF INDUSTRIAL ELECTRONICS

suppliers of the finest reprocessed

Polyethylene

with guaranteed electrical properties

POLYTHENE LTD., 100 Jermyn St., London, S.W.1
Tel.: WHitehall 3978
Grams: Lebathene, Piccy Cables: Lebathene London

DEEGLAS

GLASS FIBRE MAT

for better mouldings

Just as metal tie-rods increase the strength of concrete, so Deeglas Glass Fibre Mat makes possible stronger plastic mouldings. Deeglas can now be supplied pre-impregnated with a range of resins, e.g. Phenolic pre-preg. Deeglas is suitable for moulding either by pressure or vacuum methods and gives a strength and weight ratio nearly double that of aluminium. These pre-preg. methods have already proved their worth in aircraft, boats and cars.

Deeglas is easy to handle and simple to mould. It has an even distribution of fibre. May one of our Technical Representatives call to discuss your own problems which can be solved by the use of Deeglas mat or any of our other products such as Rovings, Chopped Fibre or Cloth.

Deeglas

PUTS **STRENGTH** *INTO PLASTICS*

For further details, and samples of Rovings, Chopped Fibre and Cloth write to:
GLASS YARNS & DEESIDE FABRICS LTD.
Craven House, 121 Kingsway, London, W.C.2. Tel: Chancery 7343

GD.4

PLEASE NOTE

DAVIS BROS. (M & P) LTD.

are now known as

EDWARD DAVIS (PLASTICS) LTD.

20 ALL SAINTS ROAD, LONDON, W.11
Telephone : PAR 9874/5

Warehouses:-

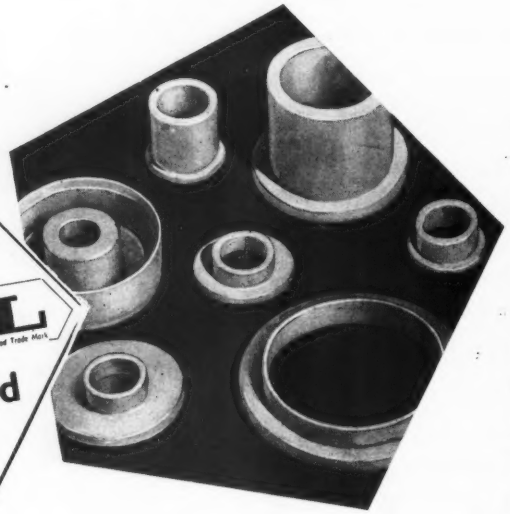
7a WEST END LANE, LONDON, N.W.6
83a CABLE STREET, LONDON, E.1.

PLASTIC SCRAP WANTED

All types of Polythene Polystyrene mouldings and P.V.C. Scrap

---

Bushes & Bearings
NYMOL
Registered Trade Mark
precision moulded in Nylon



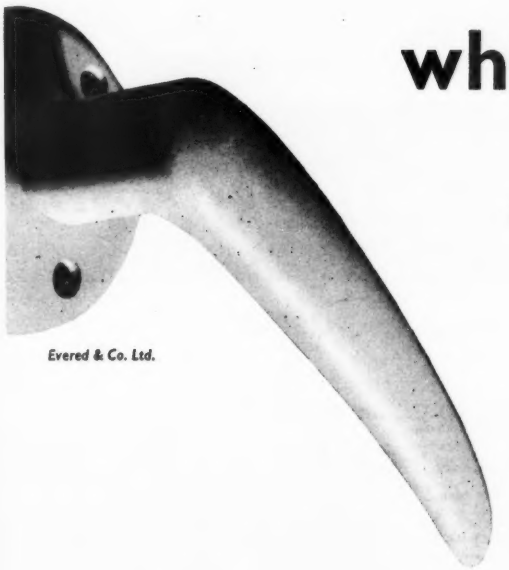
★ Nylon as a new engineering material, possesses, in high degree, the merits of Low Friction Coefficient, High Abrasion Resistance, and Resilience. In many cases it can also show appreciable cost advantage.

Plastic Engineers Limited

TREFOREST, GLAMORGAN
Telephones: Treforest 2371/2

Lacrinoid Products Ltd.

Evered & Co. Ltd.



Evered & Co. Ltd.

which will be chosen

Which design is preferable?
Which will the public want?
What makes each good or bad, according to its lights?
What advantages has each in production?

The answers are matters of design—
and therefore matter for **Design**

Design magazine reviews modern industrial design in all its aspects.
It is not a 'precious' publication:
the writing is authoritative, the illustrations telling, the subject matter businesslike and comprehensive—covering anything from pottery to switchgear, typewriters to jam jars

Thus you gain not only current news of design in your own industry—but also useful ideas from other industries, other countries, facing design problems similar to your own

it pays to read Design

Send for this month's issue (2/3 post free)
or better still take out a year's subscription
(25s. for 12 issues post free)

use this form — — — — — — — *copies should be addressed to:*

please send me this month's issue of **Design**
I enclose 2/3

please send me **Design** *regularly every month*
starting with the issue. I enclose 25s

to the Circulation Manager **Design**
Council of Industrial Design
491 Tilbury House Petty France London SW1

person or department

firm

address

description of firm

whatever shape you take precisely— we can make!

★ *We illustrate examples of Polythene and Diakon injection moulded coil formers of which we have a wide standard range. We shall be glad to send further details on request.*

Precision and quality are indeed our watch-words. From a range of thermoplastics, including P.V.C., Polystyrene, Diakon, Polythene and Nylon, we injection mould a multitude of different shapes and sizes at the rate of thousands.

Hellermann LTD.

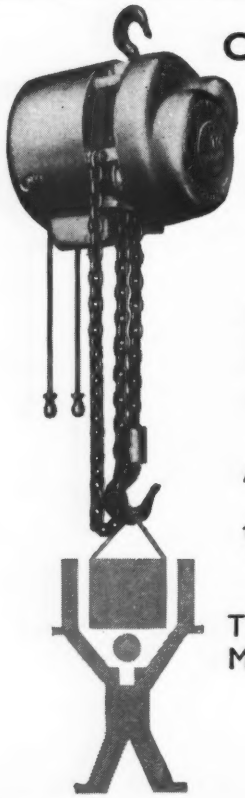
(A Subsidiary of Bowthorpe Holdings Ltd.)

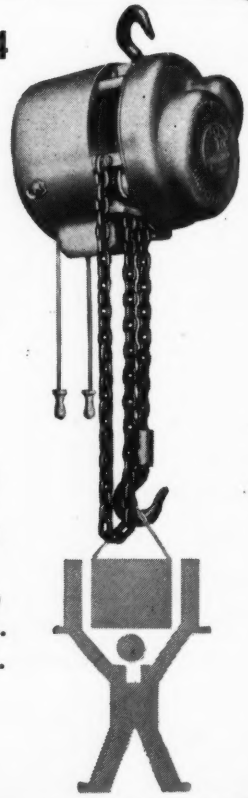
CRAWLEY, SUSSEX

Telephone: CRAWLEY 747/8/9

MORE AND MORE

CL54 **Vaughan** CL54





Powerlift HOIST BLOCKS are going into Industry in many KEY positions as a worth-while investment for SPEEDING-UP OUTPUT, and saving manhandling.

A few typical prices for 10 ft. hook to hook lift on 3-ph. A.C. Supplies
$^1/_4$ - $^1/_2$ ton £79, 1 ton £89, $1^1/_2$ ton £98

— *Full details from*

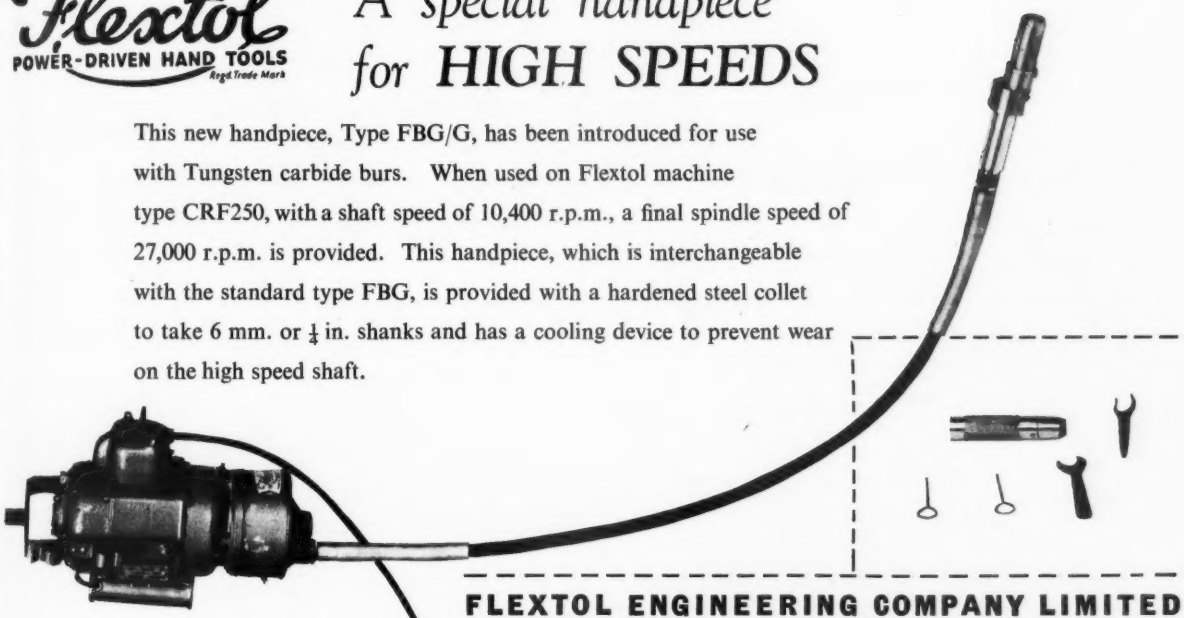
THE VAUGHAN CRANE CO. LTD.
MANCHESTER 12 ENGLAND.
Telephone EASt 1473

Dispatch - Ex Stock

Flextol
POWER-DRIVEN HAND TOOLS
Regd. Trade Mark

A special handpiece for HIGH SPEEDS

This new handpiece, Type FBG/G, has been introduced for use with Tungsten carbide burs. When used on Flextol machine type CRF250, with a shaft speed of 10,400 r.p.m., a final spindle speed of 27,000 r.p.m. is provided. This handpiece, which is interchangeable with the standard type FBG, is provided with a hardened steel collet to take 6 mm. or ¼ in. shanks and has a cooling device to prevent wear on the high speed shaft.



FLEXTOL ENGINEERING COMPANY LIMITED
The Green, Ealing, London, W.5 *Telephone: EALing 6444-7*

Midlands: W. A. SIMPSON, 9 HILLSIDE AVENUE, MAPPERLEY, NOTTINGHAM. *Arnold 68273*
North: J. H. BOGG, 19 HOWARD ROAD, NORTHENDEN, MANCHESTER. *Wythenshaw 3061*
West: T. SHEPPARD, 17 STRADBROOK AVENUE, KINGSWAY, BRISTOL, 5.
Scotland: G. K. BAILLIE, 66 CRAIGLOCKHART ROAD, EDINBURGH, 11. *Edinburgh 88345*
Home Counties, North of Thames: G. J. HIRD, 60 BASILDON AVENUE, ILFORD.
Home Counties, South of Thames: J. M. DAVERS, 45 THE AVENUE, CHISWICK, W.4.

For Glass Reinforced Plastics of all types

Consult

MICROCELL

LIMITED

IMPERIAL BUILDINGS 56 KINGSWAY
LONDON, W.C.2

Telephone: Chancery 3424

M.3

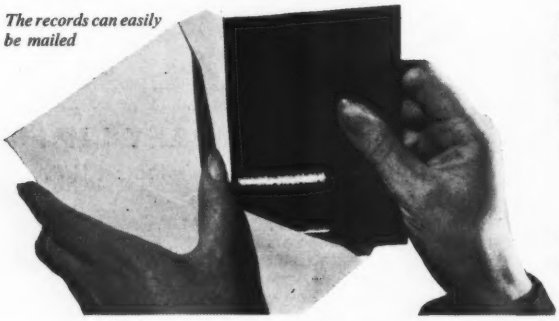
Inside secret

of the Dictaphone Time-Master Dictating Machine

. . . (say the Dictaphone Co. Ltd.) is a revolutionary plastic Dictabelt record, which takes 15 minutes dictation, folds flat, and can be mailed or filed.

Fitting a Dictabelt record to the machine.

The records can easily be mailed



These records are made from 'Tenite' Butyrate, extruded as a seamless thin-walled tube and cut into sections. Surface accuracy is all-important, and extrusion is carried out to extremely fine limits (·0005 in. tolerance on wall thickness). The records are none the less tough and flexible, and can easily be folded flat for filing or mailing without damage to the recording surface.

Write for information and moulding samples to :

T.E.C. PRODUCTS DIVISION Kodak LTD

KODAK HOUSE, KINGSWAY, W.C.2 Telephone : Holborn 7841

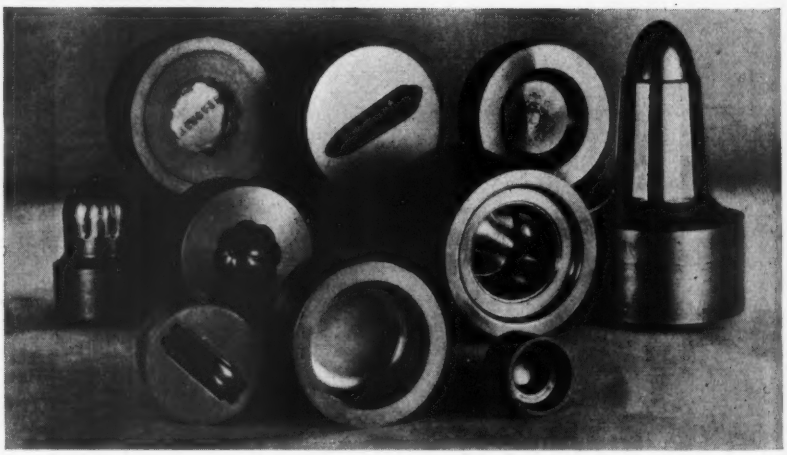
Photographs courtesy Dictaphone Co. Ltd. *'Tenite' is a registered trade-mark*

Hobbing can save you money on moulds

Consult us to see if we can hob your mould cavities. Expensive time spent on die-sinking can often be avoided.

★

First Class
Service
and Delivery



L. WHITING LTD.

• *Hobbers to the Trade* •

296, Latimer Road, North Kensington, W.10. Telephone : LADBROKE 3521

What do they do with Precipitated Calcium Carbonate?

It has many advantages when used for laminates, castings and mouldings. White and chemically pure, it produces no unfortunate colour effects. Being free from grit and abrasive matter it assists the formation of a smooth product surface. Particle shape and size is regulated in manufacturing so the processer is sure of uniformity. STURGE P.C.C. is available in several grades.

Uncoated grades:
CALOPAKE and STURCAL
Coated grades:
CALOFORT (ultra-fine) and
CALOFIL (low oil absorption)

Recommended for polyesters—
CALOFIL
Recommended for polyvinyl chloride—
CALOFORT

JOHN & E. STURGE LIMITED
1 Wheeleys Road, Birmingham, 15
Telephone: Midland 1236/7

Manufacturers of Fine Chemicals since 1823

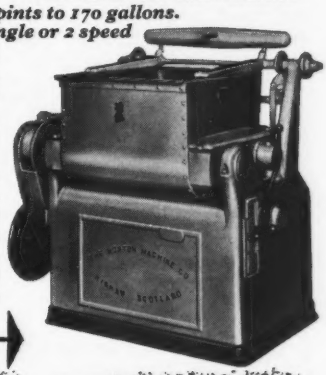
STURGE S PRODUCTS PCCA

MIXING IS OUR BUSINESS

DUPLEX MIXERS

Range: 5 pints to 170 gallons. Single or 2 speed

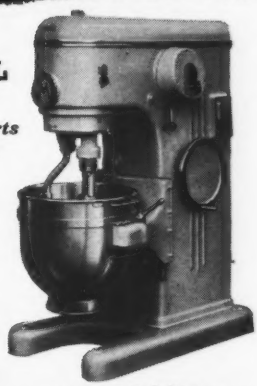
Can be adapted for Vacuum and/or pressure—tilting or non-tilting types. Machines can be modified to suit individual requirements. Steam or water jackets can be fitted. Machines Mild Steel, Stainless Steel or Brass construction. Part or whole Grid Lids can be fitted.



VERTICAL MIXERS

Range: 10 American Quarts to 120 Imperial Quarts

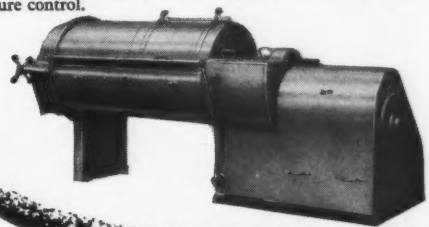
Designed for extremely heavy duty work. Easy to clean—Beaters quickly changed. Bowl Scraper saves scraping down by hand. "STOP" position to prevent beater creep. Shock absorbers in elevating mechanism.



TWIN WORM MIXERS

Two models 50 and 100 gallons

The ideal machine where an unusually homogeneous mix is essential, also suitable for mixing solids with solids or liquids with solids. Excellent for the mixing of Yeast, Chocolate, Baking Powders, Face Powders, Talcs, Cosmetics, Dyestuffs, Starches, Dry Battery Compound, etc. The machine is self-emptying—simply raise the discharge door and the beater blades force the contents through the opening. Can be jacketted for temperature control.



MORTON

MORTON
MACHINE COMPANY LIMITED

Atlantic Works, Wishaw, Scotland
Telephone: Wishaw 700. *Telegrams: Mortonmix, Wishaw*

Pioneer Plastic House

NOTED FOR TECHNICAL ACCURACY AND DELIVERY. OVER 40 YEARS' EXPERIENCE. WE POSSESS A WELL EQUIPPED TOOL ROOM AND DEAL WITH REALLY DIFFICULT SUBJECTS.

Address enquiries to

MOULDING DEPARTMENT ← → **TURNING AND MACHINING DEPARTMENT**

W. H. TANT & CO. LTD.

DOLLMAN STREET, BIRMINGHAM, 7

Phone: ASTon Cross 3232

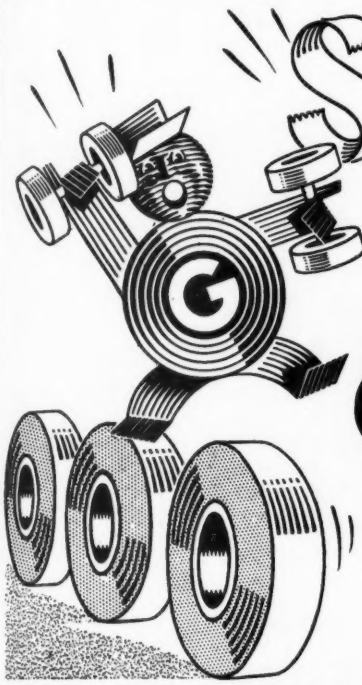
These **P.V.C.** pipes just *can't* corrode!

HERE's an important new Tenaplas development. We now make unplasticised rigid P.V.C. tubes that are proof against most corrosive chemicals. They are particularly suitable for piping all types of petroleum compounds.

We design installations and either put them in for you or train your own staff to do it. Can we get together and talk costs? We think we can give you a pleasant surprise.

Tenaplas *THE PIONEERS IN PLASTIC EXTRUSIONS*

Tenaplas Ltd., Upper Basildon, nr. Pangbourne, Berks. *Tel: Upper Basildon* 333



Sunny Sep.

Gives you 'pep' when you're rolling along on

Gosheron TAPES

Thousands of users call them "the magic rolls" — and "magic rolls" they really are in speeding production from raw materials to finished goods — with the finished goods safely sealed to preserve quality and user goodwill.

JOHN GOSHERON & CO LTD GAYFORD ROAD LONDON W12

Telephones: SHEpherds Bush 3326-8 & 6271-4 (7 lines)

DRM

DURHAM CHEMICALS PRODUCED AT BIRTLEY, COUNTY DURHAM

P.V.C. STABILISERS

Metal Stearates,
Laurates, Ricinoleates,
Lead Silicate

Branch Offices:

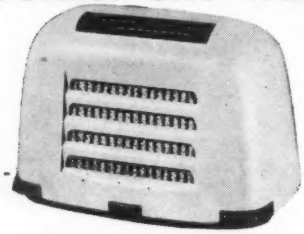
1 Booth St., Albert Sq., MANCHESTER, 2	Neville Hall, WestgateRd., NEWCASTLE-ON-TYNE, 1	166 Buchanan Street, GLASGOW, C.1
Deansgate 5581	*Newcastle 21261*	*Douglas 2561*

Head Office:

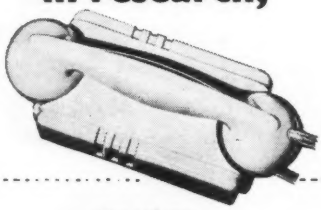
DURHAM RAW MATERIALS LTD, 1/4 GT TOWER ST, LONDON, EC.3 · MANsion Ho: 4333

KM

points the way

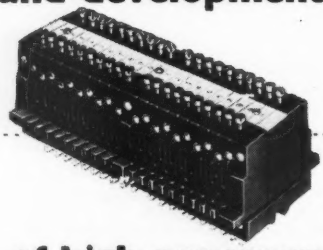


in research,

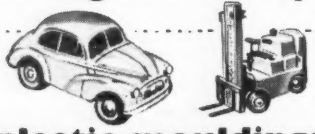


design,

and development



of high accuracy



plastic mouldings

KENT MOULDINGS invite your enquiries for injection, transfer and compression mouldings. K.M. engineers will be happy to examine any problem and give you sound and honest advice.

KENT MOULDINGS

PROPRIETORS HOLSTEN BRANDES LIMITED

FOOTSCRAY, KENT Telephone: FOOtscray 3333

Stabilisers for P.V.C.

PIGMENTING TYPES

BASIC LEAD CARBONATE

—specially prepared for P.V.C., supplied only as dispersed paste with Plasticisers to choice.

DIBASIC LEAD PHOSPHITE

TRIBASIC LEAD SULPHATE

TRANSLUCENT TYPES

LEAD SILICATE

DIBASIC LEAD STEARATE

LEAD STEARATE

CADMIUM STEARATE

CALCIUM STEARATE

BARIUM STEARATE

LITHIUM STEARATE

A complete system available for heat, light and dielectric requirements

With the exception of White Lead (Basic Lead Carbonate), these Stabiliser/Lubricants are supplied dry, or as non-settling dispersions which facilitate easy mixing and efficient intimate contact with P.V.C.

ASSOCIATED LEAD

MANUFACTURERS LIMITED

SPECIAL CHEMICALS DIVISION, CRESCENT HOUSE, NEWCASTLE UPON TYNE, 1, ENGLAND.

ASSOCIATED LEAD PRODUCTS

BETTER

TRY '600'

FIRST !

for

PLASTICS MACHINERY

OF ALL TYPES

Including:

Two-roll Mixing Mills • Pre-form Tabletting Machines • Hydraulic Compression and Injection Moulding Presses • Extruders Pumps and Accumulators • Vulcanising Pans.

THE 600 GROUP OF COMPANIES

GEORGE COHEN

SONS AND COMPANY LIMITED

Established 1834

WOOD LANE, LONDON, W.12

'Phone: Shepherds Bush 2070. 'Grams: Omniplant, Telex, London

STANNINGLEY, Near LEEDS

'Phone: Pudsey 2241. 'Grams: Coborn, Leeds

And at Kingsbury (Nr. Tamworth) · Manchester · Glasgow · Morriston, Swansea · Newcastle · Belfast · Sheffield · Southampton · Bath

P/5212/HP37(Z)

Formapex Laminates

Versatile and efficient for electrical insulations and mechanical applications

"Formapex" laminated plastic in two basic forms: Paper base for electrical insulations and fabric base for Roll Neck Bearings, Silent Gears etc.

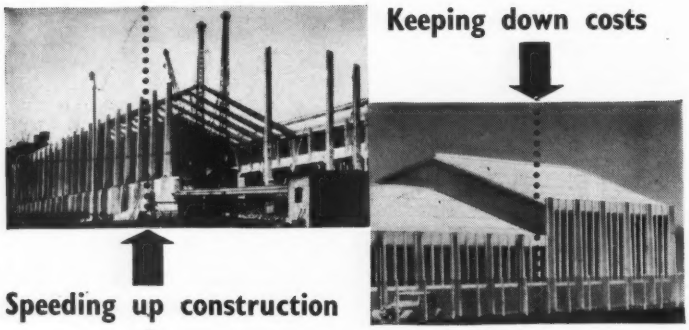
LINAPEX Varnished fabrics and tapes for the electrical and cable industries.

SILOPEX Woven glass fabric and Silicone varnished tape insulation for temperatures up to 300°C.

TERAPEX Varnished insulating tapes and cloth based on "Terylene" manufactured by I.C.I. Ltd.

OCOBIND Black adhesive tape for general insulating purposes.

IOCO LIMITED, ANNIESLAND, GLASGOW, W.3.



we aim both ways

Beecham Industrial Buildings operate at a constructional speed and a competitive cost that boosts the growth of any industrial enterprise. We manufacture the precast reinforced concrete structure so that three quarters of the job has been completed when the components leave our factory gates. Our highly trained and fully mechanized mobile teams construct the entire building. The use of both steel and traditional building labour are reduced to a minimum. Our extensive range of semi-standardized structural and walling components permit us to design buildings to meet almost any specific requirement. Flexibility in planning, good natural lighting, ventilation and thermal insulation are well within the scope of our techniques and both individual components and structural assembly are designed in accordance with the recognised codes of practice for permanent reinforced concrete construction, Beecham Buildings are competitive in cost — they are also economical to maintain.

Beecham Buildings

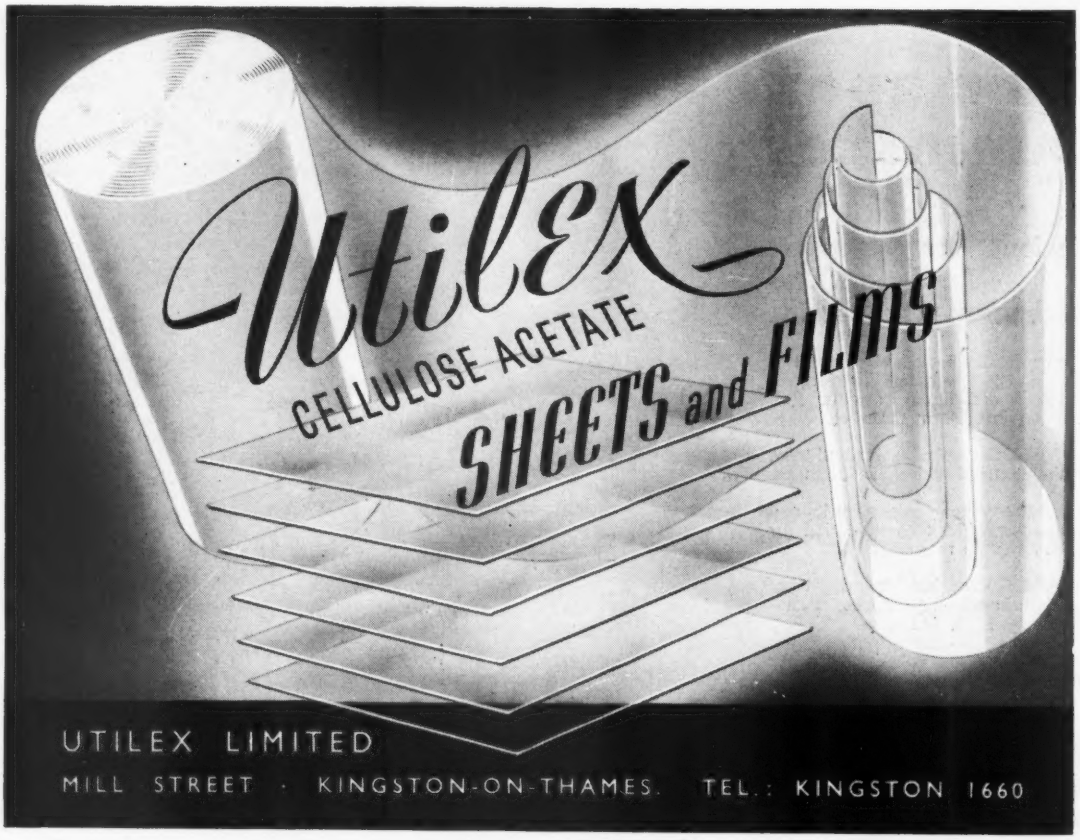
May we advise you on your new building?

Dept. K

BEECHAM BUILDINGS LIMITED SHIPSTON-ON-STOUR, WARWICKSHIRE

Telephone: Shipston-on-Stour 215 or 3287

211-378

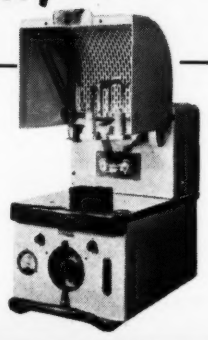


RADYNE

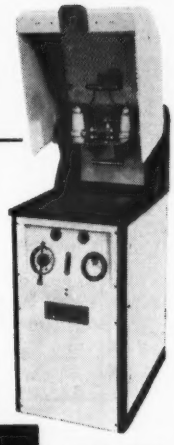
sets the standard in

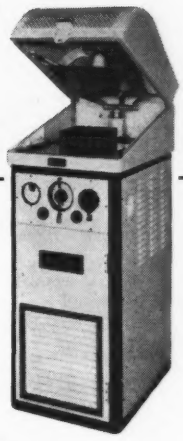
DIELECTRIC PREHEATING

Four fine equipments to speed your production



MODEL H5/A
Will fully plasticise up to 6 oz. of moulding powder per minute. Output 500 watts. Easily portable: weight only 180 lb.





radio heaters ltd.
WOKINGHAM · BERKS · ENGLAND
Phone: Wokingham 1030-1-2
Grams: Radyne, Wokingham

MODEL H7/B
Will plasticise up to 12 oz. of wood-filled moulding powder per minute. Output over 1 kW. Weight 200 lb.: easily movable on rubber-mounted castors.

MODEL H25/A
Will plasticise up to 2 lb. of wood-filled moulding powder per minute. Output 3 kW. Weight 500 lb. Unit mounted on rubber tyred castors.

MODEL H50
A super speed high temperature pre-heater capable of heating 1 lb. of powder to 150°C in ¾ minute, or normally preheating 4 lb. in a minute Output 6 kW.

Moulds for Plastics

By W. M. Halliday

An aid to Toolmakers in the plastics and pressure diecasting industries dealing with mould design, construction and maintenance.

"An important and comprehensive handbook for plastic mould engineers and to all those connected with manufacturing plastics products."
—MODERN PLASTICS

259 pp. Price 30s. *30s. 6d. by post*

TEMPLE PRESS LIMITED
BOWLING GREEN LANE, LONDON, E.C.1

Cellulose Acetate Plastics

By Vivian Stannett

THIS IS THE First Book to be entirely devoted to a thorough technical survey of the properties and potentialities of this well-known thermo-plastic. It is designed to be of equal interest and value to the business man and the engineer or chemist, and includes a chapter on packaging and container applications.

Illustrated, 30s. net, by post 30s. 8d.

TEMPLE PRESS LIMITED

BOWLING GREEN LANE, LONDON, E.C.1

Please write for full list of books published in association with "Plastics."

MOULD MAKING BY SPRAYING

WITH FUSIBLE CERRO-ALLOYS

Specially designed by R. E. Pickstone for the **Quantity Production of Moulds** for casting resins and some thermoplastics from models of metal, wood and modelling wax; also for the **protective coating** by metal of wooden foundry pattens. Also, **excellent impressions** can be made of almost any materials, including soft fragile substances such as wax, living tissue, etc.

THIS IS THE GUN featured in the article on "Mould Making by Spraying" in the July issue of *PLASTICS*

PRICE £12. 0. 0. complete

THE PICKSTONE FUSIBLE ALLOY SPRAY GUN

recommended for use with Cerrobend, Cerrosafe, Cerrotru, Woods' Metal and other bismuth alloys.

For fullest details, write or phone: **R. E. PICKSTONE LTD.**

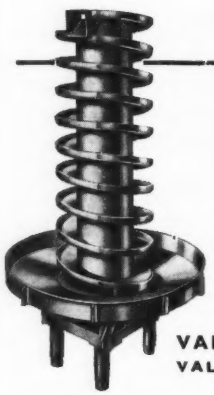
56/60, ISLINGTON PARK STREET, LONDON, N.1. (CANonbury 6190)

TRADE EMPIRITE MARK

Empire Plastics (BIRMINGHAM) Ltd

EMPIRE WORKS
BRUETON STREET
BIRMINGHAM · 4
Phone: ASTon Cross 2451

PLASTIC MOULDINGS FOR THE TRADE



VIBRATORY Spiral ELEVATOR

ELECTRICALLY OPERATED

Ideal for a wide range of Applications

Will handle Powders, Granules, Small Solids, etc. Rate of feed can be controlled through a very wide range. Height of elevation up to 10 feet. For further particulars send for Leaflet No. 110.

VALLEY PRODUCTS (LYE) LTD.
VALLEY ROAD, LYE, STOURBRIDGE
Telephone: Lye 124

TUFFLEX

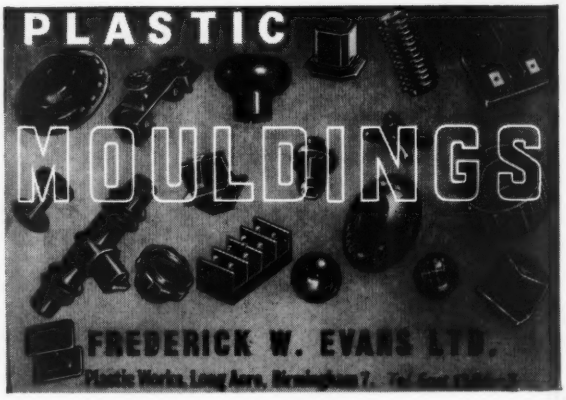
EXTRUSIONS are our business . . .
Not just a department

AS the leading specialists in this field our technical staff welcome enquiries for all types of extruded plastics. We can promise you also keen personal service and a completely satisfactory product.

C&C MARSHALL LTD

PLASTRIP HOUSE, OAKLEIGH ROAD NORTH, LONDON, N.20

Telephone: Hillside 5041 (3 lines). Telegrams: Tufflex, Norfinch, London
Cables: Tufflex, London



JOHN CASTLE & Co. Ltd.

STOCKISTS of Perspex Sheets, Virgin and Reground Cellulose Acetate, Polythene and Polystyrene Moulding Powders.

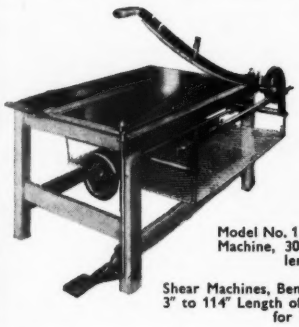
POLYTHENE, Polystyrene, Acetate and Perspex. We are sellers and buyers of these materials in any form.

GRANULATION plant available for reprocessing Acetate, Polystyrene, Polythene, and other Thermoplastic scrap. Materials ground to customer's requirements.

All enquiries to :—

JOHN CASTLE & Co. Ltd.
5 HURLEY ROAD, LONDON, S.E.11
Telephone : RELiance 4274/5

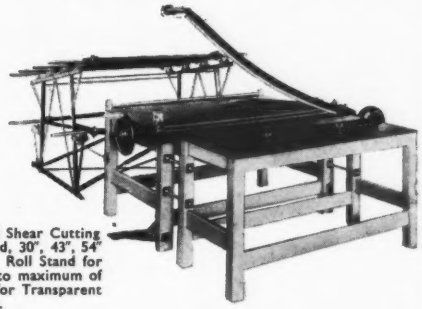
SHEAR CUTTING MACHINERY *for* **Cutting Sheet Plastics and Rubber, etc.**



T. KENDELL & SONS LTD.

Established 1840

FRENCH PLACE, LONDON, E.1.



Model No. 1 Hand Shear Cutting Machine, 30", 43", 54" and 60" length of cut.

Shear Machines, Bench and Floor Models. From 3" to 114" Length of cut. Many other Machines for Your Trade.

Model No. 1 R.F. Hand Shear Cutting Machine with Roll Stand, 30", 43", 54" and 60" length of cut. Roll Stand for any number of rolls up to maximum of six. Specially suitable for Transparent Film, etc.

For PLASTIC MOULDINGS

LINKING

QUALITY WITH SERVICE

CONSULT

SOUPLEX LTD.

WESTGATE · MORECAMBE · TELEPHONE 1717

M. CALDERON LTD.

SPECIALISTS IN

THE MANUFACTURE OF

HEATING ELEMENTS

FOR THE

PLASTICS MOULDING INDUSTRY

ALL ENQUIRIES TO HEAD OFFICE:

227 UPPER STREET, LONDON, N.1 **CAN. 4252/3**

M.C.M.

(TOOLS) LTD.

Designers and Toolmakers

for Compression, Transfer and Injection Moulds, Pressure Die Casting Tools, Jigs and Fixtures

Let us solve your difficulties

M.C.M. (Tools) LTD. 12, Denmark Street, Aston BIRMINGHAM, 19 *Aston Cross 1878*

Wanted

STOCKS for CASH

We are cash buyers of merchandise of every description. Also Clearance Stocks, Discontinued Lines, Surplus and Redundant Stocks, **BOTTLES, Jars, Screw Caps, Cartons,** and other **Packaging Materials.** In fact, goods of all kinds can be disposed of through us without delay, on the most favourable terms, and without trouble.

Should you have anything for disposal either now or at any future time please send us samples, full particulars and price on a cash settlement basis and the matter will have our immediate and careful attention.

RELIANCE TRADING CO.

13, NEW COLLEGE PARADE, FINCHLEY RD., LONDON, N.W.3

Are You Buying

B.L.C.

(EXPORTS) LIMITED

92 BAYLIS ROAD

LONDON S.E.1

TELEGRAMS BALACA

TELEPHONE WATerloo 3616-7

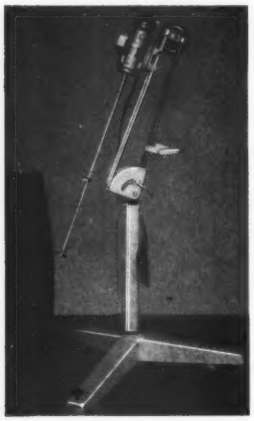
HOME AND EXPORT

the **RIGHT** *Quality at the* **RIGHT** *Price?*

for **ALL THERMOPLASTICS**

CELLULOSE ACETATE · BUTYRATE

POLYSTYRENE · P.V.C., etc., etc.



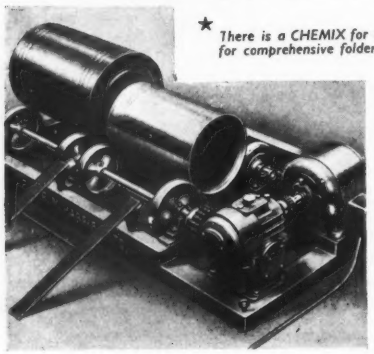
The Answer to your Mixing Problems

The NEW Chemix portable mixer with adjustable stand

¼ and ½ h.p. motor, with variable speed control providing constant speed against load variation.

The Chemix DRUM MIXER

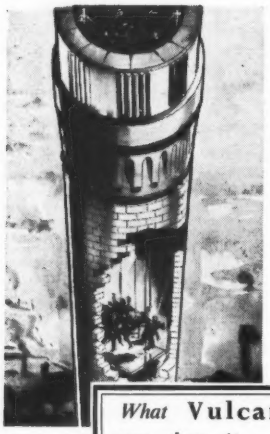
For quick mixing of paints, oils, powders. No agitators; no lifting gear required. Simple and certain in action. Fully adjustable for all drums—2 gal. to 75 gal.



★ *There is a CHEMIX for every mixing purpose. Send for comprehensive folder and full particulars.*

F. & R. M. HARRIS
(BIRMINGHAM) LTD.
Chemical Engineers
17-18, DOE ST., BIRMINGHAM, 4
Telephone: CENtral 5585
Telegrams: "CHEMIX, Birmingham"

In association with J. K. INNES & CO. LTD., LAWS LANE, CARLISLE



THIS JAM WAS LETHAL

What **Vulcan** *say about it . . .*

Four men descending from the top of a new chimney were riding on a materials hoist when the hoist jammed owing to unequal thickness of the guides, and some slack ran out in the rope. The jam then cleared itself but the brake failed to hold the platform, which ran free until the slack was taken up with a jerk. Two passengers were shaken off and killed.

Users of cranes and hoists seem unusually accident-prone, so safety regulations should be meticulously enforced. Two such regulations went overboard here.

Engineer-Surveyors from Vulcan Insurance not only test ropes, tackle and all the machinery of lifts and hoists they insure, they also help in safety education. If you know the pains they take over boilers you will welcome their attention to all the plant and machinery in your care.

THE Vulcan *67 King Street, Manchester 2*
BOILER & GENERAL INSURANCE CO. LTD.

FREE: For news of industrial accidents and ways to avoid them ask us now for "Vulcan"—a quarterly journal for Power users. Please write to Dept. 11

CANNING VONITE
POLISHING COMPOSITION

Used with a "Climax" mop for producing a brilliant finish on celluloid, vulcanite polystyrene and other plastics. In bars approx. 1 lb. each.

W. CANNING & CO. LTD.
BIRMINGHAM 18

LONDON & SCANDINAVIAN METALLURGICAL CO LIMITED

Injection moulds for small and intricate articles

Sole manufacturers of hard nickel electroformed cavities

DIES FOR REFLECTORS

CHELTON WORKS, GONSALVA ROAD, LONDON, S.W.8 MACaulay 5575

W. B. COLDWELL & SONS LTD.

DIESINKERS, MOULDS, JIGS.

DIPLOMA FOR DIE SINKING 1911

89-91, ROCKINGHAM LANE,
SHEFFIELD, 1.
TELEPHONE: SHEFFIELD 24047.

MODERN
FACTORY
OF 40,000 SQUARE FEET
REQUIRED
IN NORTH OR NORTH-EAST LONDON
FOR LIGHT ENGINEERING
GROUND FLOOR BUILDING PREFERRED
CHAMBERLAIN & WILLOWS
23, MOORGATE, E.C.2. · · CITy 6013

BYSON FOR BAKELITE

Acetate and other Synthetic Mouldings, Modern Plant and Facilities.

APPLIANCE CO. LTD.,
WOOLFOLD, BURY, LANCS.
Telephone: Bury 1560-1 Telegrams: "Bysonite, Bury."

FIRE!

OUR RECORDS LOST BUT FOR

NU-SWIFT!

"So unexpected, so quickly... blazes everywhere...three old-fashioned extinguishers failed... but reliable Nu-Swift had the fire out in seconds." When will YOU get up-to-date?

NU-SWIFT LTD · ELLAND · YORKS
In Every Ship of the Royal Navy

AJAX

Air Turbine

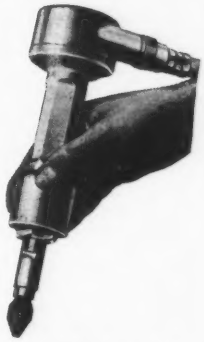
HAND GRINDERS FOR YOUR MOULDS

AJAX JUNIOR

Weighs only 8 oz. Speed approx. 90,000 R.P.M. For Grindstones ⅛" to ¼" dia. Sturdy Spindle Collet bored for ¼" dia. shanks. Air Pressure required 50-100 lbs./sq. in.

Leaflets P2 and P3 on request.

Please state Air Pressure when ordering.



BRIGGS BROS. & CO.,
Ajax Works, Jakeman Rd.,
Birmingham, 12
Phone CALTHORPE 2995

AJAX II and AJAX III

Powerful, yet easily handled. Speed approx. 50,000 R.P.M. For Grindstones ¼" to ½" dia. Collet bored for 6 mm. or ¼" dia. shanks. Air Pressure required 50-100 lbs./sq. in.

PIONEERS

IN

MOULDS
for MODERN PLASTICS

also

PRESS TOOLS, JIGS & GAUGES

BARBER & DUFFY LTD.
214/222 CARDIGAN ROAD · LEEDS
Phone: Leeds 52033

PLASTIC SCRAP

Michael S. Stevens

Buyers at Your Works of Injection Scrap, Scrap Cuttings

KESWICK ROAD, LONDON, S.W.15
VANdyke 3345-6

NATIONAL COLLEGE OF RUBBER TECHNOLOGY

Holloway Road, London, N.7.

The College is financed by the Ministry of Education, and supported by the Industry. In addition to training for the Diplomas of the College, the courses offered include :—

A.I.R.I.

Three-year full-time course. Qualification for entry—G.C.E. with at least two of the subjects, chemistry, physics and mathematics at Advanced Level, and the third studied to that level.

Associateship Course for Graduates

One year full-time course

L.I.R.I.

One-year intensive full-time course for those at ordinary G.C.E. level wishing to qualify for a position of subordinate responsibility in the rubber industry. Success in this course also qualifies for admission to the A.I.R.I. course.

Research Courses

Suitably qualified rubber technologists are accepted for specialised courses leading to fellowship of the National College (F.N.C.R.T.) and higher degrees by research.

Prospectus, giving details of Scholarships and all full-time, part-time and evening courses, free on application.

Classified Advertisements

PRESS DAY.—Classified advertisements for the October issue must be received at Head Office by first post September 28th. Last-minute additions and deletions are accepted by telephone from trade advertisers up to noon. Advertisements received too late for a particular issue are automatically inserted in the succeeding one unless instructions to the contrary are received.

RATES.—4d. per word (minimum 12 words 4/-). Each paragraph charged separately and name and address must be paid for. Semi-displayed setting 35/- per single column inch. Series discounts of 5% for 6, and 10% for 12 consecutive insertions allowed to trade advertisers.

TERMS.—Strictly net and prepayable. Monthly accounts or settlement by the end of the month following insertion are allowed to trade advertisers if satisfactory references are provided.

REMITTANCES.—Cheques and postal orders should be crossed and made payable to TEMPLE PRESS LIMITED and instructions sent addressed to the Manager, "Plastics," Bowling Green Lane, London, E.C.1.

THE PROPRIETORS retain the right to refuse or withdraw advertisements at their discretion and are not responsible for clerical or printers' errors although every care is taken to avoid mistakes.

BOX NUMBERS.—Private advertisers desiring to have replies sent care of "Plastics" may do so on payment of 1/- to cover booking and postage, plus cost of four extra words. To avoid mistakes in forwarding, Box Numbers should be carefully and legibly copied and replies sent to Box P000, care of "Plastics," Bowling Green Lane, London, E.C.1.

DEPOSIT SYSTEM facilities are available to readers to purchase advertised goods through "Plastics." Commission 1% (minimum 2/-) on amount deposited.

HEAD OFFICES: Bowling Green Lane, London, E.C.1, England. Telephone Terminus 3636. Telegrams: "Pressimus, Phone, London."

BRANCH OFFICES: 5, Suffolk Street, Birmingham, 1. Telephone: Midland 4117-8. 50, Hertford Street, Coventry. Telephone: Coventry 62464. 1, Brazennose Street, Manchester. Telephone: Blackfriars 5038-9. 12, Renfield Street, Glasgow. Telephone: Glasgow Central 1413.

AGENCIES

PROGRESSIVE MANUFACTURERS of laminated plastics insulation invite applications from agents with ability to obtain inquiries from large electrical, aircraft, shipping and other industrial users of precision machined component parts.

Write in confidence, stating other lines, experience of material and connection. Commission basis. Box P0523, care of "Plastics." 206-1078

LONDON WHOLESALERS, well introduced and regularly calling on leather goods manufacturers (bags, belts and small goods), will accept agency for plastic, leathercloth, suedene, lining materials, etc. Applications invited from actual manufacturers only. Box P068, care of "Plastics." 206-x2886

CONSULTANTS

PULVERIZING, grinding, screening, consultant. E. D. W. Kidd, Weymede, Byfleet, Surrey. 209-1072

ELECTRO-PLATING

SPECIALIST on electro-plating plastics (own process) invites offers. Twelve years manager of plating firm. Box P0611, care of "Plastics." 206-x2713

LENSES

LENSES with good optical properties in various plastics are available for incorporating in instruments and toys. Send for samples. Alana Optical Co., Ltd., Trading Estate, Bridgend, Glam. Phone, Bridgend 942. 206-x3009

MACHINERY, TOOLS AND PLANT

ALTERATIONS. Diesel sets, electric motors, switch gear, transmission equipment, fluorescent lighting and industrial fittings ex stock, keen prices. Contact G. L. Murphy, Ltd., Manston, near Leeds. zzz-210

LIMITED NUMBER unused "Brooks" powerful motorized extractor-blower fan units, in three sizes, £10, £15 and £20 each. Fraction cost of manufacture. Details and impressive users' list sent gladly. Demonstrations here amazing everyone. Bellangers, 306 Holloway Rd., London, N.7. North 4117. 206-x2966

HYDRAULIC POWER PLANT FOR DISPOSAL.

Two 3-throw pumps by Rice, giving 21 gal./min. at 1,500 p.s.i. direct-geared to English Electric Co. 35 h.p. unity power factor induction motors. Complete with oil-immersed starters and line switches.

Two ditto, giving 52 gal./min. at 400 p.s.i. geared to E.E.C. 25 h.p. slip ring motors. Complete as above.

Two deadweight type hydraulic accumulators with 8 ft. stroke containing 13 gal. at 1,500 p.s.i. Complete with check, safety and motor relief valves.

Two ditto with 12 ft. stroke containing 60 gal. at 400 p.s.i. Complete as above.

All at Triplex Works, Kings Norton, Birmingham. 206-22

PLASTICS MACHINERY.

Hydraulic Presses of all sizes. Injection Machines. Extruders. Mixing Mills. Hydraulic Pumps and Accumulators.

Send your inquiries to the specialists,

REED BROTHERS (ENGINEERING), LTD.,
REPLANT WORKS,
CUBA STREET, MILLWALL, E.14.
Phone, East 4081 (five lines) 206-1

HYDRAULIC. Frazer Mono-radial pumps, new and second-hand, in stock. Thompson and Son (Millwall), Ltd., Cuba St., London, E.14. East 1844. zzz-483

Machinery, Tools and Plant (contd.)

HYDRAULIC PRESSES

400-ton Greenwood and Batley upstroke hydraulic press with 16-in. dia. fiscolized ram by 28-in. stroke and two 2¾-in. dia. pushback rams. Four columns 22½ in. by 20½ in. Table area 34½ in. by 22½ in. Daylight 3 ft. 4½ in. W.P. 2 tons sq. in.

100-ton downstroke hydraulic press by Finney. Ram 12 in. dia. by 20-in. stroke and two 2-in. dia. pushback rams. Four columns, distances between 20½ in. by 14½ in. Tee slotted tables 2 ft. sq. Daylight 32 in. Arranged for prefilling. W.P. 1 ton sq. in.

80-ton downstroke hydraulic press by Finney. Ram 10½ in. dia by 18-in stroke with two 2-in.-dia. pushback rams. Four columns, 21 in. by 10 in. between. Tee slotted tables 18 in. sq. Daylight 30 in. Arranged for prefilling. W.P. 1 ton sq. in.

50-ton upstroke hydraulic press by Thompson, having 8-in.-dia. fiscolized ram and two 1-in.-dia. pushbacks by 14-in. stroke. Four columns 20 in. by 5 in. Table 20 in. by 14 in. Daylight adjustable, 21 in. to 30 in. W.P. 1 ton per sq. in.

50-ton upstroke hydraulic press by Finney, 8-in.-dia. fiscolized ram and two 1½-in.-dia. pushback rams by 20-in. stroke. Four columns 15 in. by 10 in. between. Table area 16 in. by 15 in. Daylight 24 in. W.P. 1 ton sq. in.

Two 25-ton upstroke hydraulic presses by Thompson, 6-in.-dia. fiscolized ram by 12-in. stroke. Four columns 15½ in. by 6 in. Table 15½ in. by 12 in. Daylight adjustable, 18 in. to 12 in. Fitted are a pair of 1-in.-dia. pushback rams. W.P. 1 ton sq. in.

Two 25-ton upstroke hydraulic presses by Plastics and Rubber M/cy. 4-in.-dia. ram by 10-in. stroke. Four columns 11¼ in. by 6¼ in. between. Table 12 in. by 11¼ in. Daylight 13 in. W.P. 2 tons sq. in.

10-gramme hand-operated injection moulding machine by Francis Shaw, mounted on a steel frame, having two main tie bars 1½ in. dia. and 7½ in. between. Band-type heater.

Three single-punch pelleting machines by Duncan Stewart, for making tablets up to 2½ in. dia. by ⅜ in. thick. Max. filling depth 1¼ in., rate 30 per min. With 5 h.p. motor and starter.

Masson grinding and defibrizing mill by Blackfriars Eng. Co.

Two water-cooled grinding discs with vertical adjustment. Motorized 40 h.p. 400/3/50.

GEORGE COHEN SONS AND CO., LTD.,
WOOD LANE,
LONDON, W.12.
Phone, Shepherd's Bush 2070.
AND
STANNINGLEY, NR. LEEDS.
Phone, Pudsey 2241. 206-23

MACHINERY, TOOLS AND PLANT WANTED

INJECTION MOULDING MACHINES REQUIRED. Condition or size not important. Send details. Box P023, care of "Plastics." 207-1062

COMPRESSION AND INJECTION MOULDING TOOLS wanted. Send details of your surplus, obsolete and redundant moulding tools. Box P0113, care of "Plastics." 206-01057

MISCELLANEOUS

EXTEND YOUR TRADE.
Use a trade mark. Consult
Trade Mark Protection Society,
12 Church St., Liverpool. zzz-478

MOULDS

IF YOUR INJECTION MOULDS ARE TOO COSTLY or troublesome this new firm of master craftsmen, with many years practical moulding experience, will produce them for you, cheaper, correctly designed and guaranteed to work without expensive tryouts. Box P046, care of "Plastics." 206-1071

IF YOU NEED
IMMEDIATE AND INEXPENSIVE
INJECTION MOULDING CAPACITY
FROM 2 TO 32 OZS.
(BUT ESPECIALLY 8 OZ.)
CONTACT US WITHOUT DELAY
AT BOX P0513,
CARE OF "PLASTICS." 210-1076

SPECIALIST DESIGNERS of plastics moulds, compression, transfer and injection tools. Optimal Designs, 95 Mortimer Crescent, Worcester Park, Surrey. 207-x2714

PATENTS

THE PROPRIETORS of British Provisional Patent relating to extruded plastic article of horticultural value offer the invention for exploitation by licence and/or sale. Inquiries Box P066, care of "Plastics." 206-12

PRODUCTION CAPACITY

INJECTION MOULDINGS AND PLASTIC COVERINGS in acetate alkathene, p.v.c. machined parts in brass, steel and plastics.

We now have extra capacity and can offer quick delivery at our new factory. We solicit your inquiries.

F. A. Ketch and Son, Ltd., Trent Valley Works, Lichfield, Staffs. Lichfield 3052. zzz-476

SHORT RUNS A SPECIALITY: LONG RUNS A PLEASURE. Low mould costs and overheads. Injection capacity and technical knowledge at your service. Westminster Plastics, 367 High St. North, London, E.12. Grangewood 3777. 212-1055

VISIJAR LABORATORIES, LTD.
THE LEADING CRAFTSMEN IN
"PERSPEX"
PROTOTYPE AND REPETITION.
OFFICIAL I.C.I. STOCKISTS "PERSPEX"
SHEET, TUBE, ROD.
STOCKISTS AND FABRICATORS OF "FORMICA."
149 LONDON ROAD, CROYDON, SURREY.
Phone, Croydon 1384. zzz-467

INJECTION MOULDINGS by I.O.G. Industries, Ltd., 41 Marshgate Lane, Stratford, E.15. Maryland 2804. 208-1034

DINES PRODUCTS, Whitehall Lane, Grays, Essex, for injection mouldings. 211-1050

REPETITION in Ebonite, Erinoid, etc. Capstan lathe work. Temple St., Rugby. 210-1043

INJECTION MOULDING CAPACITY available up to 3 oz., precision moulding a speciality. Guardian Plastics, 76 and 77 Rahere St., London, E.C.1. 210-1042

Production Capacity (contd.)

INJECTION MOULDINGS IN THERMO-PLASTICS. Moulding in styrene acrylics and acetate. Design and toolroom facilities available for mould construction. Inquiries invited, J. and E. Courtenay, Ltd., 138 Stratford Rd., Birmingham, 11. 208-1067

TUBE LAMINATION ENGINEERING, LTD.,
HIGH WYCOMBE,
BUCKS.
Phone 1921-2.
MAKERS OF
SYNTHETIC RESIN BONDED TUBES,
ROUND, SQUARE AND RECTANGULAR
FABRICATORS AND ASSEMBLERS
IN PLASTICS AND METALS,
FULL SUPPORTING MACHINE SHOP
AVAILABLE. zzz-472

CAPACITY AVAILABLE for manufacture of compression and injection moulds to customer's own designs, modern plant and equipment.

Inquiries for same will receive prompt attention. Box P0520, care of "Plastics." 206-1077

PLASTICS (MANCHESTER), LTD.,
BRITAIN'S LEADING STOCKISTS AND DISTRIBUTORS.
SPECIALISTS IN
FABRICATION, INJECTION MOULDING AND ENGRAVING.
11 WHITWORTH STREET,
MANCHESTER, 1.
Central 7081-2 and Central 1000 zzz-468

KINGSTON PLASTICS, LTD., Unity Works, Union St., Kingston-on-Thames. Manufacturers of virgin and second-grade cellulose acetate moulding powders, matched to customer's own requirements for colour and flow. Customer's own waste also reprocessed to specified requirements. Sorting and grinding incorporating magnetic separation of metallic particles of all thermoplastics undertaken. Phone, Kingston 8405. 207-1063

ELCO PLASTICS, LTD.,
HIGH WYCOMBE, BUCKS.
Phone 1921-2.
OVER 50 PRESSES.
EXPERIENCED COMPRESSION, TRANSFER AND INJECTION MOULDERS.
DESIGNERS AND MAKERS OF MOULDS ON THE PREMISES.
CAPACITY UP TO 500-TON COMPRESSION AND 10 OZ. INJECTION.
LARGE ASSEMBLY SHOPS.
A.I.D. APPROVED. zzz-473

SMALL FACTORY CAPACITY AVAILABLE. Equipped hand injection machines, fly presses, two power presses, benches, etc. SB. Leytonstone 3707. 206-15

CHIPPING OF PLASTICS AND GRINDING, screening, mixing and drying of all raw materials undertaken for the trade. Crack Pulverizing Mills, Ltd., Plantation House, London, E.C.3. Man 4405. 206-4

INJECTION MOULDING
CAPACITY AVAILABLE TO
32 OZ.
SPECIALISTS IN PEN MOULDINGS
AT REALLY KEEN PRICES.
ROLLRITE PLASTICS,
HEREFORD.
Phone, Hereford 4782. 209-1069

COMPRESSION AND INJECTION MOULDING capacity immediately available in all thermosetting and thermoplastic materials. Customers' own moulds can be used or tools provided in our up-to-date toolroom. Box P996, care of "Plastics." 206-3

PRODUCTION CAPACITY WANTED

LONDON MANUFACTURERS require compression moulding capacity for long runs on small components, first-class multi-impression moulds supplied by advertisers. State capacity available. Box P0431, care of "Plastics." 206-1073

RAW MATERIAL

PERSPEX ! PERSPEX !! PERSPEX !!! Official stockists for I.C.I. acrylic sheets. Sheets cut to your requirements. Fabrication and mounting specialists to the trade:—

S. C. Errington (Hanwell), Ltd., 132a Uxbridge Rd., Hanwell, London, W.7. Phone, Ealing 5288. zzz-460

ALWAYS LARGE STOCKS OF
CASEIN
RODS, TUBES AND SHEETS,
PERSPEX
SHEETS UP TO 1 IN. THICK.
CELLULOSE ACETATE
CATALIN RODS.
S.R. (PLASTICS), LTD.,
93 ALDERSGATE STREET, E.C.1.
Phone, Monarch 4686. 210-1037

SAVE TIME AND MONEY!

If you require a good service for turned parts in all plastics—or—

Supplies of casein, ebonite, fibre, laminated bakelite, in rods, sheets and tubes, or cellulose acetate and butyrate tubing, contact: A. E. Goodeve, Ltd., 188a Seven Sisters Rd., London, N.7. Archway 3654-6721. 211-1054

POLYSTYRENE, new and reground, for disposal. Box P0610, care of "Plastics." 206-7

PLASTICS (MANCHESTER), LIMITED.
BRITAIN'S LEADING STOCKISTS
OF
PERSPEX SHEET, ROD, TUBE.
11 WHITWORTH STREET,
MANCHESTER, 1.
Central 7081-2 and 1000. 206-2

PHENOL FORMALDEHYDE, Alkali resisting, approximately 8 tons surplus material, far below cost price, for sale. Box P0614, care of "Plastics." 206-9

POLYTHENE, reground, some colours for disposal. Please inquire Box P069, care of "Plastics." 206-5

BLACK CELLULOSE ACETATE MOULDING POWDER. We can always supply first grade at 2s. per lb., any quantity. Box P008, care of "Plastics." 206-25

CUEX, LTD., can offer all at prices well below current list:—

Polystyrene.
Cellulose acetate.
Polyethylene.
P.V.C.
Polyvinyl butyral.
Perspex and Diakon.

Send now for details.

Cuex, Ltd., 27 Corporation St., Birmingham. Central 5474. 206-21

FOR HOME AND EXPORT MARKET. We sell, at low prices, all plastic scraps, Acetate, Polystyrene, Alkathene, re-ground powders and reconditioned powders. Apply to Box P009, care of "Plastics." 206-26

INEXPENSIVE POLYTHENE SHEETING, 42 in. by 22 in., all thicknesses. Polythene block in wide range of sizes. Theraplastics, Ltd., 35 Cornwall Gardens, London, S.W.7. Western 1382. 206-17

RAW MATERIAL WANTED

WANTED, Polythene scrap. Write to Box P7416, care of "Plastics." zzz-0322

PROMPT CASH OFFERED for virgin and reprocessed cellulose acetate and polystyrene. Give manufacturer's name and packing. Box P873, care of "Plastics." zzz-464

POLYSTYRENE, any colour. Full particulars to Box P033, care of "Plastics." zzz-479

P.V.C. GARMENT AND HANDBAG OFFCUTS wanted. We collect and pay cash. Brockwell Plastics, Ltd., 50 Hollingbourne Rd., S.E.24. zzz-463

Raw Material Wanted (contd.)

SCRAP
THE
LARGE BUYERS
ARE
MICHAEL S. STEVENS,
KESWICK ROAD WORKS, S.W.15.
Vandyke 3345-6. zzz-482

SURPLUS STOCKS of thermosetting and thermoplastic moulding powders wanted. Send details Box P056, care of "Plastics." zzz-481

ACETATE SHEETING, clear 10 to 20 thou., any surplus lots required. Please offer with particulars. Box P0613, care of "Plastics." 206-8

SCRAP.
WE BUY
ALL THERMO-PLASTICS, REJECTED MOULDED PIECES, OBSOLETE MOULDING POWDERS, LUMPS, SPRUES AND RUNNERS.
AND PAY HIGHEST PRICES.
J. W. NASH AND CO., LTD.,
27 BEETHOVEN STREET, W.10.
Ladbroke 4655. 206-24

POLYSTYRENE AND POLYTHENE, any quantities of virgin material, scrap and nozzle lumps urgently wanted. Please offer with samples to Herbert Connor, Ltd., 120 Beaufort Park, Falloden Way, London, N.W.11. 206-6

ERLANOS, LTD., 93 Aldersgate St., E.C. (Monarch 4686), require Perspex and cellulose offcuts and scrap, clear and coloured, highest prices paid. 217-1079

SITUATIONS VACANT

The engagement of persons answering advertisements in respect of vacant situations must be made through a local office of the Ministry of Labour, or a scheduled employment agency, if the applicant is a man between the ages of 18 and 64 inclusive or a woman between the ages of 18 and 59 inclusive, unless he or she, or the employment, is excepted from the provisions of Notification of Vacancies Order, 1952.

CHARGEHAND WANTED for extruding department of north-west rubber manufacturers. Must be fully experienced in all types of rubber extrusions. Give particulars of experience, age and salary required. Box P0515, care of "Plastics." 207-1074

NORTH-WEST MANUFACTURERS require foreman able to control production of rubber and plastic conveyor belting. Excellent opportunity. State experience, age and salary required. Box P0516, care of "Plastics." 207-1075

SALES EXECUTIVE required for London, Birmingham and Manchester by firm merchanting many lines in industrial plastics. Experienced personnel please write Box P063, care of "Plastics." 206-16

DRAUGHTSMAN required for Barking factory belonging to important public company, salary not less than A.E.S.D. rate, five-day week; canteen, club and pension facilities. Box P064, care of "Plastics." 206-14

CROMPTON PARKINSON, LTD., have a vacancy at their Derby Cable Works for a chemist with special knowledge of plastics as applied to electric cables; this is an interesting opening for a suitably qualified man; excellent working conditions, superannuation scheme, canteen and other first-class amenities.

Applications should be addressed to Ref. MD/P(PC), Crompton Parkinson, Ltd., Crompton House, Aldwych, London, W.C.2. 206-13

DRAUGHTSMEN. Seniors required immediately by large plastic moulding organization in N.E. London; applicants experienced in compression, transfer and injection mould design; commanding good salary; suitable applicants from allied trades considered. Write Box P065, care of "Plastics." 206-11

CHIEF CHEMIST required for one of the leading glove manufacturers in the North of England who are contemplating making up gloves and mittens for the protective clothing trade, knowledge of plastics and dipping processes essential, also capable of taking complete charge of plant.

All replies will be treated in strict confidence. Please state salary required. Box P067, care of "Plastics." 206-10

Situations Vacant (contd.)

MECHANICAL ENGINEER required for development work on compression mouldings of specialized electrical components. Practical experience of moulding processes and moulds as well as experimental ability essential. Factory E.18. Write Box P062, care of "Plastics." 206-20

DESIGNER DRAUGHTSMAN required with experience of moulds in plastic compression work. General experience in press tool and jig designs an advantage. Factory E.18. Good scope in small drawing office. Write Box P061, care of "Plastics." 206-19

IMPORTANT LANCASHIRE MANUFACTURING COMPANY whose products reach all branches of engineering industry require man with engineering background, age 27-35, for technical sales department.

Knowledge of plastics and glass textile reinforcement materials would be of considerable advantage. Give full particulars, in strict confidence, to Box P0612, care of "Plastics." 207-18

SITUATIONS WANTED

WORKS MANAGER, graduate chemist, aged 30 with seven years experience in formulation and production of synthetic resins for impregnating, laminating, moulding, bonding, sheet moulding, etc. Available early 1955. Four-figure salary. Box P0521, care of "Plastics." 206-x1578

FOREMAN, or assistant manager, age 30, sound toolroom, moulding, finishing and assembly experience, seeks progressive position London area. Box P0616, care of "Plastics." 206-x3010

SALES MANAGER, 43, car owner, 8 years experience plastics industry (thermoplastics) seeks new position London area. Box P0615, care of "Plastics." 206-x3008

TIME RECORDERS

FACTORY TIME RECORDERS. Service rental. Phone, Hop 2230. Time Recorder Supply and Maintenance Co., Ltd., 157-158 Borough High St., S.E.1. 209-1111

BOOKS AND PUBLICATIONS

COLOUR CARDS AND SAMPLE BOOKS are made by Alfred Thornton, Ltd., of Joseph St., Bradford, Yorks. Phone, Bradford 23308. zz:-47

THE THEORY OF POLYMERIZATION, by H. R. Fleck, M.Sc., F.R.I.C. Full examination in simple language with examples, calculations and exercises of this fundamental aspect of the chemistry of plastics. Illustrated, 144 pages, 10s. 6d. net from booksellers or 11s. by post from the publishers, Temple Press Ltd., Bowling Green Lane, London, E.C.1. zz:

PLASTICS, SCIENTIFIC AND TECHNOLOGICAL (3rd edition), by H. R. Fleck, M.Sc., F.R.I.C. A completely revised edition of a recognized standard work on the chemistry and technology of plastics. ". . . should be in every technical library."—Times Review of Industry. Illustrated, 440 pages, 40s. net from booksellers, or 40s. 9d. by post from the publishers, Temple Press Ltd., Bowling Green Lane, London, E.C.1. zz:

INDEX TO ADVERTISERS

Name	Page
A	
Ashdowns, Ltd.	26
Associated Lead Manufacturers, Ltd.	72
B	
Bakelite, Ltd.	Back Cover, 46
Ball, W. W., & Sons, Ltd.	43
Barber & Duffy, Ltd.	79
Beecham Buildings, Ltd.	74
B.I.P. Engineering, Ltd.	35
Birkbys, Ltd.	51
B.L.C. (Exports) Ltd.	77
Blythe Colour Works, Ltd.	Inside Back Cover
Brand, Ed., Ltd.	54
Brauer, F., Ltd.	52
Bridge David & Co., Ltd.	24
Briggs Bros. & Co.	79
British Celanese Ltd.	36, 56
British Electrical Development Association, The	13
British Geon, Ltd.	27
British Industrial Plastics, Ltd.	49
British Resin Products, Ltd.	5
BX Plastics, Ltd.	Inside Front Cover
Byson Appliance Co., Ltd.	79
C	
Calderon, M., Ltd.	77
Canning, W., Ltd.	78
Caplin & Co. (Plastics)	54
Castle, John & Co., Ltd.	76
Chamberlain & Willows	78
Chase, Bernard	42
Cohen, George, Sons & Co., Ltd.	73
Coldwell, W. B., & Sons, Ltd.	78
Cole, R. H., & Co., Ltd.	32
Courtaulds, Ltd.	50
D	
Davis (Plastics) Ltd., Edward	64
Design	65
Durham Raw Materials, Ltd.	71
E	
Ebonestos Industries, Ltd.	28
Elliott, E., Ltd.	4
Empire Plastics (Birmingham) Ltd.	76
Erinoid, Ltd.	Front Cover, 20
Ether, Ltd.	63
Evans, Frederick W., Ltd.	76
F	
Fawcett, Preston & Co., Ltd.	10
Ferguson, James & Sons, Ltd.	17, 52
Fothergill & Harvey (Sales), Ltd.	7
Firth Brown Tools Ltd.	29
Flextol Engineering Co. Ltd.	67
Fraser & Glass Ltd.	15
G	
General Electric Co., Ltd., The	16, 44
Glass Yarns & Deeside Fabrics, Ltd.	63
Gosheron, John & Co., Ltd.	71
Greenwich Leathercloth Co., Ltd. The	19
Grist Plastics, Ltd.	6
H	
Harris, F. & R. M., (Birmingham), Ltd.	78
Hellerman, Ltd.	66
I	
Imperial Chemical Industries. Ltd.	21
Imperial Chemical Industries, Ltd.—Billingham Development	8
Industrial Appliances, Ltd.	18
Injection Moulders, Ltd.	39
International Combustion, Ltd.	57
Ioco, Ltd.	73
J	
Jobling, James A., & Co., Ltd.	62
K	
Kendell & Sons, Ltd.	77
Kent Mouldings	72
Kenure, J. F. Ltd.	60
Kleestron, Ltd.	22, 23, 25
Kodak, Ltd.	68
L	
Lacrinoid Products, Ltd.	40
Lavino (London) Ltd.	37
London & Scandinavian Metallurgical Co., Ltd.	78
M	
Maniplastics, Ltd.	45
Marshall, C. & C., Ltd.	76
May and Baker, Ltd.	38
M.C.M. Tools, Ltd.	77
Microcell, Ltd.	67
Mining & Chemical Products, Ltd.	41
Monsanto Chemicals, Ltd.	30, 31, 58
Morton Machine Co., Ltd.	69
N	
National College of Rubber Technology	79
National Plastics (Sales), Ltd.	48
Nu-Swift, Ltd.	79
P	
P.A.M., Ltd.	60
Pickstone, R. E., Ltd.	76
Plastic Engineers, Ltd.	64
Polythene, Ltd.	63
R	
Radio Heaters, Ltd.	75
Reliance Trading Co.	77
Resinous Chemicals, Ltd.	12
Rootes Mouldings, Ltd.	59
S	
Shaw, Francis & Co., Ltd.	55
Simon, Henry, Ltd.	53
Souplex, Ltd.	77
Sterling Moulding Materials, Ltd.	34
Stevens, Michael, S.	79
Streetly Manufacturing Co., Ltd., The	9
Sturge, John, E., Ltd.	69
Styrene Products, Ltd.	20
Surridge's Patents, Ltd.	62
T	
Tant, W. H., & Co., Ltd.	70
Tenaplas (Sales) Ltd.	70
Thermo-Plastics, Ltd.	2
U	
United Ebonite & Lorival, Ltd.	11
Universal Metal Products, Ltd.	1
Universal Tools, Ltd.	14
Utilex, Ltd.	74
V	
Valley Products (Lye) Ltd.	76
Vaughan Crane Co., Ltd., The	66
Vinatex, Ltd.	61
Vulcan Boiler & General Insurance Co., Ltd., The	78
W	
Whiting, L., Ltd.	68
Windsor, R. H., Ltd.	33
Y	
Yadran, Ltd.	3

EDITORIAL AND BUSINESS NOTICES

"PLASTICS" is published on the second Wednesday in each month in London, England, by TEMPLE PRESS LIMITED, and is registered for transmission to Canada and Newfoundland by magazine post.

ADVERTISEMENT AND PUBLISHING OFFICES.—Bowling Green Lane, London, E.C.1, England. Telephone: Terminus 3636. Telegrams: "Pressimus, Phone, London."

EDITORIAL OFFICES.—27, Shaftesbury Avenue, London, W.1. Telephone: Gerrard 4406.

BRANCH OFFICES.—5, Suffolk Street, Birmingham, 1. Telephone: Midland 4117-8. 50, Hertford Street, Coventry. Telephone: Coventry 62464. 1, Brazennose Street, Manchester, 2. Telephone: Blackfriars 5038-9. 12, Renfield Street, Glasgow. Telephone: Glasgow Central 1413.

EDITORIAL.—All editorial communications and matter must be addressed to the editor and not to individuals. Drawings or MSS or other material not considered suitable will be returned if stamps are enclosed, but the Editor does not hold himself responsible for the safe keeping or safe return of anything submitted for his consideration. Payment for contributions will be made during the month following publication.

ADVERTISEMENTS.—Whilst every precaution is taken to ensure accurate printing, the publishers will not be responsible for printers' errors, or for errors arising out of telephonic instructions relating to advertisement copy, nor can they accept responsibility for the loss of or damage to advertisers' blocks left in their custody. Copy must be supplied without application from the publishers, and current copy and blocks will be repeated if new copy is not received at the time of closing for press. Orders for advertisements are subject to acceptance in writing from the Head Offices. Advertisement copy is subject to the approval of the publishers. All advertisements and contracts are accepted and made upon the express condition that the publishers have the absolute right to refuse to insert copy to which they may object for legal, public or trade reasons, which includes the right of rejection of advertisements, whole or part, containing cut prices of goods coming under an approved price-maintenance scheme, and such refusal of copy shall not be a good ground for advertisers to stop a current contract or to refuse to pay for the same, or for taking action for breach of contract. The publishers, whilst endeavouring to ensure that advertisements shall appear with all possible regularity, will not be held liable for any loss occasioned by the failure of any advertisement to appear from any cause whatever. The acceptance of an order does not confer the right to renew upon similar terms. Contracts relate to the advertisers' own goods or services, and the space may not be sub-let or disposed of in any way. Conditions which are contained in order forms other than those of the Proprietors and which do not conform to, or are in addition to, the Proprietors' conditions, will not be recognized as binding. Special conditions must be subject to mutual agreement.

SUBSCRIPTIONS AND SUPPLIES.—"Plastics" is obtainable to order from newsagents and bookstalls or by post from the publishers at an annual subscription rate of 34/- (Canada and U.S.A. $5.50), postage included. Shorter periods pro rata. Subscriptions are prepayable.

"Plastics" is obtainable from newsagents and bookstalls abroad through the following agents:—EUROPE—Messageries Dawson (S.A.), Paris; Messageries Hachette et Cie, Paris; W. H. Smith & Son, Paris and Brussels. U.S.A.—International News Co., New York. Canada—Wm. Dawson, Subscription Service Ltd., Toronto, etc.; Gordon & Gotch, Ltd., Toronto. AFRICA—Central News Agency, Ltd., Cape Town; W. Dawson & Son (S.A.), Cape Town. ASIA—W. Thacker & Co., Ltd., P.O. 190, Bombay. AUSTRALIA and NEW ZEALAND—Gordon & Gotch (A'sia), Ltd.

REMITTANCES.—Postal orders, cheques, etc., should be made payable to TEMPLE PRESS LTD.

COMMUNICATIONS.—All orders, letters and inquiries regarding advertisements, subscriptions, and other business matters should be addressed to the Manager, "Plastics," Bowling Green Lane, London, E.C.1.

Printed in England and Published Monthly by the Proprietors, TEMPLE PRESS LTD., BOWLING GREEN LANE, LONDON, E.C.1

PLASTICS and COLOUR

Without colour how very limited would be the scope and appeal of plastics. Lamp shades, telephones, spectacle frames, ash trays, paper knives, table cloths, sheetings and a thousand-and-one other things are dependent upon colour for much of their attractiveness. And in many cases upon Blythe Permanent Colours, as permanent as colours can be. Whether they are used as pure colours or as pastel shades of the utmost delicacy, Blythe inorganic pigments are unrivalled for fastness to light, heat and the most arduous conditions.

Wherever colours of utmost permanence are required, our specialised experience as manufacturers of the world's best colours is always available.

Blythe

COLOUR WORKS LTD

CRESSWELL · STOKE-ON-TRENT

THE HOME OF THE WORLD'S BEST COLOURS

Vol. XIX. No. 206 Plastics SEPTEMBER, 1954

VYBAK Plastics are what you want them to be

as finished sheet, VYBAK can be formed, machined or welded. As a compound it can be economically moulded or extruded in an infinite number of shapes and sizes . . . Do you want it flexible—or rigid? VYBAK is either. Coloured or transparent? VYBAK gives you the choice. Perhaps you want toughness, strength, electrical properties, dimensional stability, exceptional resistance to chemicals . . . ? VYBAK offers all these and more. For so many jobs large and small no sooner is a question asked than an answer is found in—

The main properties of VYBAK p.v.c. materials include strength, good electrical characteristics, and resistance to water, chemicals, flexing and ageing. They are supplied as :

- *Moulding or extrusion compounds—rigid and flexible; coloured and clear*
- *Pressed or calendered sheet for machining or forming. Rigid and flexible; coloured, transparent or translucent grades*
- *Vybak pvc-a copolymer resins*

VYBAK Plastics

BAKELITE LIMITED

12-18 GROSVENOR GARDENS · LONDON · S.W.1 · TELEPHONE LOane 0898

0898